REVIEW COMMENT RECORD (RCR)

1. Date 09/29/05	2. Review No.
3. Project No. 216-Z-9	4. Page 1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
Validation Package for SDG H2556	Borehole Soil Sampling	RL Weiss	ERC - S&DM	Sigma 1 372-9631

17. Comment Submittal Approval:	10. Agreement with indicated comment disposition(s)	11. Closed
Organization Manager (Optional)	R. L. Weiss 09/29/2005 Reviewer/Point of Contract Date R. L. Weiss Author/Originator	11-14-05 Reviewer/Point of Contact Date Author/Originator

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/resolve the discrepancy/problem indicated.)	14. Reviewer Concurrence Required	15. Disposition (Provide justification if NOT accepted.)	16. Status
1	Wet Chemistry, Volatile, Radiochemistry – No comments			
2	Inorgnanics, Pages 2,4, & 10; Pages 2 and 4 indicate MS failure for Cd. This should be for Sb, including revised recovery values. Page 10 duplicates page 11 except Cd is incorrectly qualified.			ok RLW 11-14-05
3	Semivolatile, Pages 10 & 11; The summary pages should also include n-nitroso-di-n-propyalmine for flagging for low MS and MSD recoveries.			ok RLW 11-14-05

ORP-114
(02/02)

ORP - REVIEW COMMENT RECORD (RCR)

1. Date	2. Review No.
Sept 7, 2005	N/A
3. Project No.	4. Page 1 of 1
216-Z-9	

5. Document Number(s)/Title(s)	6. Program/Project/Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
Data Package SDG H2556	GRP & Waste Sites/216-Z-9 Char	Bill Thackaberry	Env & Science Assurance (QA)	E6-35 372-0742

17. Comment Submittal Approval	10. Agreement with indicated comment disposition(s)	11. CLOSED
Organization Manager (optional)	W C Thackaberry Reviewer/Point of Contact 2/8/06 Date Requester	W C Thackaberry Reviewer/Point of Contact 2/8/06 Date Requester

12. Item	13a. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/resolve the discrepancy/problem indicated.)	14. Reviewer Concurrence Required	15. Disposition (Provide justification if NOT accepted). Provide separate attachments if necessary.	16. Status
1	Semivolatiles, pg 11, list of compounds J flagged due to MSD recovery should include n-nitroso-di-n-propylamine to be consistent with the MSD recovery paragraph on pg 3.		C	C
2	Inorganics pg 2, MS/MSD section, 2nd paragraph says cadmium is J flagged. The minor deficiencies paragraph says the same thing. The Table on page 10 shows cadmium as J flagged. However the Metals Data Qualification Summary on page 8 does not include a J flag for Cadmium. The Cadmium data on page 12 is not flagged.		C	C
3	Inorganics, page 11 is a duplicate of page 10.		C	C
	no comment on Volatiles, wet chemistry, radiochemistry			

Date: 23 September 2005
To: Fluor Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 216-Z-9 Trench Characterization Borehole - Soil
Subject: Semivolatile - Data Package No. H2556

INTRODUCTION

This memo presents the results of data validation on Data Package No. H2556 prepared by Lionville Laboratory Inc.(LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample	Media	Validation	Analysis
B17N52	3/23/04	Soil	C	See note 1

1 - Semivolatiles by 8270 & TPH-D (diesel and kerosene) by 8015B.

Data validation was conducted in accordance with the FHI validation statement of work and the Plutonium/Organic-rich Process Condensate/Process Waste Group Operable Unit Representative Sites Sampling and Analysis Plan, DOE/RL-2001, Rev. 0. Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation

DATA QUALITY OBJECTIVES

- **Holding Times/Sample Preservation**

Analytical holding times were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirement for semivolatile organics are extraction within 14 days of the date of sample collection and analysis within 40 days from the date of extraction.

If holding times are exceeded, but not by greater than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR". If the holding time is

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exceeded and the samples not properly preserved, results are rejected and flagged "R/UR".

Due to the holding time being exceeded by greater than twice the limit, all diesel range organics and kerosene results were rejected and flagged "R".

All other holding times were met.

- **Method Blanks**

Method blank analyses are conducted to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. Analytical results for analytes present in any sample at less than five times the concentration of that analyte found in the associated blank are qualified as non-detects and flagged "U". Common laboratory contaminants present in samples at less than ten times the concentration of that analyte found in the associated blank are qualified as non-detects. If a sample result is less than the CRQL and is less than five times (or less than ten times for lab contaminants) the highest associated blank result, the sample result value is raised to the CRQL level and qualified as undetected "U".

All method blank results were acceptable.

Field Blanks

No field blanks were submitted for analysis.

- **Accuracy**

Matrix Spike/Matrix Spike Duplicate & Blank Spike

Matrix spike/matrix spike duplicate and blank spike sample analyses are used to assess the analytical accuracy of the reported data. Matrix spike/matrix duplicate results are used to assess the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike/matrix spike duplicate analyses are performed in duplicate using five compounds for which percent recoveries must be within a range of 70-130% or within laboratory control limits. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Undetected sample results with spike recoveries outside control limits are qualified as estimates and

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flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

Due to the lack of a matrix spike duplicate analysis, all diesel range organic and kerosene results were qualified as estimates and flagged "J".

Due to a matrix spike recovery outside QC limits, all diesel range organic and kerosene results were qualified as estimates and flagged "J".

Due to a matrix spike duplicate recoveries outside QC limits, all phenol (68%), 2-chlorophenol (52%), 1,4-dichlorobenzene (6%), n-nitroso-di-n-propylamine (23%) and 1,2,4-trichlorobenzene (21%) associated results (phenol, bis(2-chloroethyl)ether, 2-chlorophenol, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 1,2-dichlorobenzene, 2-methylphenol, 3 and/or 4-methylphenol, hexachloroethane, isophorone, 2,4-dimethylphenol, bis(2-chloroethoxy)methane, 2,4-dichlorophenol, 1,2,4-trichlorobenzene, 4-chloroaniline, hexachlorobutadiene, 4-chloro-3-methylphenol, hexachlorocyclopentadiene, 2-nitroaniline, dimethylphthalate, 3-nitroaniline, diethylphthalate, 4-chlorophenyl-phenyl ether, 4-nitroaniline, 4-bromophenyl-phenyl ether, hexachlorobenzene, di-n-butylphthalate, 3,3'-dichlorobenzidine, bis(2-ethylhexyl)phthalate, di-n-octylphthalate) were qualified as estimates and flagged "J".

Due to matrix spike recoveries outside QC limits, all 2-chlorophenol (68%), 1,4-dichlorobenzene (56%), n-nitroso-di-n-propylamine (49%) and 1,2,4-trichlorobenzene (58%) associated results (bis(2-chloroethyl)ether, 2-chlorophenol, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 1,2-dichlorobenzene, hexachloroethane, bis(2-chloroethoxy)methane, 2,4-dichlorophenol, 1,2,4-trichlorobenzene, 4-chloroaniline, hexachlorobutadiene, 4-chloro-3-methylphenol, hexachlorocyclopentadiene, 2-nitroaniline, dimethylphthalate, 3-nitroaniline, 4-chlorophenyl-phenyl ether, 4-nitroaniline, 4-bromophenyl-phenyl ether, hexachlorobenzene, 3,3'-dichlorobenzidine) were qualified as estimates and flagged "J".

Due to an LCS recovery outside QC limits (68%), all 2-chlorophenol associated results (bis(2-chloroethyl)ether, 2-chlorophenol, bis(2-chloroethoxy)methane, 2,4-dichlorophenol, 4-chloro-3-methylphenol) were qualified as estimates and flagged "J".

All other matrix spike/matrix spike duplicate and blank spike results were acceptable.

Surrogate Recovery

The analyses of surrogate compounds provide a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows

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have been established by the EPA CLP program. If two surrogates of the same class of compounds (base/neutral or acid) are out of control limits, all associated sample results greater than the contract required quantitation limit (CRQL) are qualified as estimates and flagged "J". Sample results less than the CRQL and below the lower control limit are qualified as estimates and flagged "UJ". Sample results less than the CRQL with recoveries above the upper control limit require no qualification. If a surrogate recovery is less than 10%, detects are qualified as estimates and flagged "J" and nondetects are rejected and flagged "UR".

Due to the surrogate being diluted out, all pentachlorophenol, 2,4,6-trichlorophenol, 2,4,5-trichlorophenol, 2,4-dichlorophenol, bis(2-chloroethyl)ether, bis(2-chloroethoxy)methane, 4-chlorophenyl-phenylether, 4-bromophenyl-phenylether, 2-nitrophenol, 2,4-dinitrophenol, nitrobenzene, n-nitroso-di-n-propylamine, 4-chloroaniline 2-nitroaniline, 3-nitroaniline, 4-nitroaniline, 2,6-dinitrotoluene results in sample B17N54DL were qualified as estimates and flagged "J".

All other surrogate results were acceptable.

- **Precision**

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike (MS)/matrix spike duplicate (MSD) results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. Samples results must be within RPD limits of +/-35%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

Due to a RPD recoveries outside QC limits, all 1,4-dichlorobenzene (160%), n-nitroso-di-n-propylamine (72%) and 1,2,4-trichlorobenzene (93%) associated results were qualified as estimates and flagged "J".

All other MS/MSD RPD results were acceptable.

Field Duplicate Samples

No field duplicates were submitted for analysis.

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- **Analytical Detection Levels**

Reported analytical detection levels are compared against the required target quantitation limits (RTQL's) to ensure that laboratory detection levels meet the required criteria. The diesel range organics and kerosene results exceeded the analyte specific RTQL. Under the FHI statement of work, no qualification is required.

- **Completeness**

Data package No. H2556 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 98%.

MAJOR DEFICIENCIES

Due to the holding time being exceeded by greater than twice the limit, all diesel range organic and kerosene results were rejected and flagged "R". Rejected data is unusable and should not be reported.

MINOR DEFICIENCIES

The following minor deficiencies were noted:

- Due to the lack of a matrix spike duplicate analysis, all diesel range organic and kerosene results were qualified as estimates and flagged "J".
- Due to a matrix spike recovery outside QC limits, all diesel range organic and kerosene results were qualified as estimates and flagged "J".
- Due to a matrix spike duplicate recoveries outside QC limits, all phenol (68%), 2-chlorophenol (52%), 1,4-dichlorobenzene (6%), n-nitroso-di-n-propylamine (23%) and 1,2,4-trichlorobenzene (21%) associated results (phenol, bis(2-chloroethyl)ether, 2-chlorophenol, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 1,2-dichlorobenzene, 2-methylphenol, 3 and/or 4-methylphenol, hexachloroethane, isophorone, 2,4-dimethylphenol, bis(2-chloroethoxy)methane, 2,4-dichlorophenol, 1,2,4-trichlorobenzene, 4-chloroaniline, hexachlorobutadiene, 4-chloro-3-methylphenol, hexachlorocyclopentadiene, 2-nitroaniline, dimethylphthalate, 3-nitroaniline, diethylphthalate, 4-chlorophenyl-phenyl ether, 4-nitroaniline, 4-bromophenyl-phenyl ether, hexachlorobenzene, di-n-butylphthalate, 3,3'-dichlorobenzidine,

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bis(2-ethylhexyl)phthalate, di-n-octylphthalate) were qualified as estimates and flagged "J".

- Due to matrix spike recoveries outside QC limits, all 2-chlorophenol (68%), 1,4-dichlorobenzene (56%), n-nitroso-di-n-propylamine (49%) and 1,2,4-trichlorobenzene (58%) associated results (bis(2-chloroethyl)ether, 2-chlorophenol, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 1,2-dichlorobenzene, hexachloroethane, bis(2-chloroethoxy)methane, 2,4-dichlorophenol, 1,2,4-trichlorobenzene, 4-chloroaniline, hexachlorobutadiene, 4-chloro-3-methylphenol, hexachlorocyclopentadiene, 2-nitroaniline, dimethylphthalate, 3-nitroaniline, 4-chlorophenyl-phenyl ether, 4-nitroaniline, 4-bromophenyl-phenyl ether, hexachlorobenzene, 3,3'-dichlorobenzidine) were qualified as estimates and flagged "J".

- Due to an LCS recovery outside QC limits (68%), all 2-chlorophenol associated results (bis(2-chloroethyl)ether, 2-chlorophenol, bis(2-chloroethoxy)methane, 2,4-dichlorophenol, 4-chloro-3-methylphenol) were qualified as estimates and flagged "J".

- Due to the surrogate being diluted out, all pentachlorophenol, 2,4,6-trichlorophenol, 2,4,5-trichlorophenol, 2,4-dichlorophenol, bis(2-chloroethyl)ether, bis(2-chloroethoxy)methane, 4-chlorophenyl-phenylether, 4-bromophenyl-phenylether, 2-nitrophenoL, 2,4-dinitrophenoL, nitrobenzene, n-nitroso-di-n-propylamine, 4-chloroanilin3, 2-nitroaniline, 3-nitroaniline, 4-nitroaniline, 2,6-dinitrotoluene results in sample B17N54DL were qualified as estimates and flagged "J".

- Due to a RPD recoveries outside QC limits, all 1,4-dichlorobenzene (160%), n-nitroso-di-n-propylamine (72%) and 1,2,4-trichlorobenzene (93%) associated results were qualified as estimates and flagged "J".

Data flagged "J" is an estimate, but under the FHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

The diesel range organics and kerosene result exceeded the analyte specific RDL. Under the FHI statement of work, no qualification is required.

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REFERENCES

FHI, Contract #20266, *Validation Statement of Work*, Fluor Hanford Incorporated, July 7, 2003.

DOE/RL-2001, Rev. 0, *Plutonium/Organic-rich Process Condensate/Process Waste Group Operable Unit Representative Sites Sampling and Analysis Plan*.

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Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the FHI validation SOW are as follows:

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the same quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

SEMIVOLATILE DATA QUALIFICATION SUMMARY*

SDG: H2556	REVIEWER: TLI	PROJECT: 216-Z-9	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
diesel range organics motor oil	R	All	Holding time
diesel range organics motor oil	J	All	No MSD analysis
phenol, bis(2-chloroethyl)ether, 2-chlorophenol, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 1,2-dichlorobenzene, 2-methylphenol, 3 and/or 4-methylphenol, hexachloroethane, isophorone, 2,4-dimethylphenol, bis(2-chloroethoxy)methane, 2,4-dichlorophenol, 1,2,4-trichlorobenzene, 4-chloroaniline, hexachlorobutadiene, 4-chloro-3-methylphenol, hexachlorocyclopentadiene, 2-nitroaniline, dimethylphthalate, 3-nitroaniline, diethylphthalate, 4-chlorophenyl-phenyl ether, 4-nitroaniline, 4-bromophenyl-phenyl ether, hexachlorobenzene, di-n-butylphthalate, 3,3'-dichlorobenzidine, bis(2-ethylhexyl)phthalate, di-n-octylphthalate	J	All	MSD recovery

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SEMIVOLATILE DATA QUALIFICATION SUMMARY*

n-nitroso-di-n-propylamine			
bis(2-chloroethyl)ether, 2-chlorophenol, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 1,2-dichlorobenzene, hexachloroethane, bis(2-chloroethoxy)methane, 2,4-dichlorophenol, 1,2,4-trichlorobenzene, 4-chloroaniline, hexachlorobutadiene, 4-chloro-3-methylphenol, hexachlorocyclopentadiene, 2-nitroaniline, dimethylphthalate, 3-nitroaniline, 4-chlorophenyl-phenyl ether, 4-nitroaniline, 4-bromophenyl-phenyl ether, hexachlorobenzene, 3,3'-dichlorobenzidine n-nitroso-di-n-propylamine	J	All	MS recovery
bis(2-chloroethyl)ether, 2-chlorophenol, bis(2-chloroethoxy)methane, 2,4-dichlorophenol, 4-chloro-3-methylphenol	J	All	LCS recovery
pentachlorophenol 2,4,6-trichlorophenol 2,4,5-trichlorophenol 2,4-dichlorophenol bis(2-chloroethyl)ether bis(2-chloroethoxy)methane 4-chlorophenyl-phenylether 4-bromophenyl-phenylether 2-nitrophenol 2,4-dinitrophenol nitrobenzene n-nitroso-di-n-propylamine 4-chloroaniline 2-nitroaniline 3-nitroaniline	J	B17N54DL	Surrogate recovery

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SEMIVOLATILE DATA QUALIFICATION SUMMARY*

4-nitroaniline 2,6-dinitrotoluene			
1,4-dichlorobenzene n-nitroso-di-n-propylamine 1,2,4-trichlorobenzene	J	All	RPD

* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

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Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

SEMIVOLATILE /8015B ANALYSIS, SOIL MATRIX, (UG/KG)

Project: FLUOR-HANFORD					
Laboratory: LLI					
Case:	SDG: H2556				
Sample Number		B17N52		B17N52 DL	
Remarks					
Sample Date		3/23/04		3/23/04	
Extraction Date		4/5/04		4/5/04	
Analysis Date		4/8/04		4/12/04	
Semivolatile/8015B		Result	Q	Result	Q
2,4-Dinitrophenol		870	U	44000	UJ
4-Nitrophenol		870	U	44000	U
Dibenzofuran		350	U	17000	U
2,4-Dinitrotoluene		350	U	17000	U
Diethylphthalate		350	UJ	17000	UJ
4-Chlorophenyl-phenyl ether		350	UJ	17000	UJ
Fluorene		350	U	17000	U
4-Nitroaniline		870	UJ	44000	UJ
4,6-Dinitro-2-methylphenol		870	U	44000	U
N-Nitrosodiphenylamine		350	U	17000	U
4-Bromophenyl-phenyl ether		350	UJ	17000	UJ
Hexachlorobenzene		350	UJ	17000	UJ
Pentachlorophenol		870	U	44000	UJ
Phenanthrene		350	U	17000	U
Anthracene		350	U	17000	U
Carbazole		350	U	17000	U
Di-n-butylphthalate		350	UJ	17000	UJ
Fluoranthene		350	U	17000	U
Pyrene		350	U	17000	U
Butylbenzylphthalate		350	U	17000	U
3,3'-Dichlorobenzidine		350	UJ	17000	UJ
Benzo(a)anthracene		350	U	17000	U
Chrysene		350	U	17000	U
bis(2-Ethylhexyl)phthalate		350	UJ	17000	UJ
Di-n-octylphthalate		350	UJ	17000	UJ
Benzo(b)fluoranthene		350	U	17000	U
Benzo(k)fluoranthene		350	U	17000	U
Benzo(a)pyrene		350	U	17000	U
Indeno(1,2,3-cd)pyrene		350	U	17000	U
Dibenz(a,h)anthracene		350	U	17000	U
Benzo(g,h,i)perylene		350	U	17000	U
Tributylphosphate	3300	14000		41000	
Diesel Range Organics	5000	20900	UR	NA	
Kerosene	5000	20900	UR	NA	
NA = Not analyzed					

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Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results. All other qualifiers shown were applied during validation.

Lionville Laboratory, Inc.

Semivolatiles by GC/MS, Special List — Report Date: 04/20/04 11:31

RFW Batch Number: 0404L223 — Client: TNU-HANFORD F03-018,HZ556 Work Order: 11343606001 — Page: 1a

	Cust ID:	B17N52	B17N52	B17N52	B17N52	SBLKMW	SBLKMW BS
Sample Information	RFW#:	001	001 DL	001 MS	001 MSD	04LE0415-MB1	04LE0415-MB1
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	50.0	1.00	1.00	1.00	1.00
	Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Surrogate Recovery	Nitrobenzene-d5	49 %	0 D %	64 %	23 %	71 %	81 %
	2-Fluorobiphenyl	64 %	59 %	76 %	67 %	71 %	81 %
	p-Terphenyl-d14	87 %	86 %	98 %	102 %	90 %	111 %
	Phenol-d5	73 %	65 %	78 %	69 %	76 %	87 %
	2-Fluorophenol	62 %	56 %	71 %	39 %	76 %	85 %
	2,4,6-Tribromophenol	86 %	0 D %	2 * %	98 %	77 %	93 %
Phenol		350 U	17000 U	71 %	68 %	330 U	82 %
bis(2-Chloroethyl)ether		350 U	17000 U	350 U	350 U	330 U	330 U
2-Chlorophenol		350 U	17000 U	68 %	52 %	330 U	77 %
1,3-Dichlorobenzene		350 U	17000 U	350 U	350 U	330 U	330 U
1,4-Dichlorobenzene		350 U	17000 U	56 %	6 * %	330 U	68 %
1,2-Dichlorobenzene		350 U	17000 U	350 U	350 U	330 U	330 U
2-Methylphenol		350 U	17000 U	350 U	350 U	330 U	330 U
2,2'-oxybis(1-Chloropropane)		350 U	17000 U	350 U	350 U	330 U	330 U
3- and/or 4-Methylphenol		350 U	17000 U	350 U	350 U	330 U	330 U
N-Nitroso-Di-n-propylamine		350 U	17000 U	49 %	23 * %	330 U	81 %
Hexachloroethane		350 U	17000 U	350 U	350 U	330 U	330 U
Nitrobenzene		350 U	17000 U	350 U	350 U	330 U	330 U
Isophorone		350 U	17000 U	350 U	350 U	330 U	330 U
2-Nitrophenol		350 U	17000 U	350 U	350 U	330 U	330 U
2,4-Dimethylphenol		350 U	17000 U	350 U	350 U	330 U	330 U
bis(2-Chloroethoxy)methane		350 U	17000 U	350 U	350 U	330 U	330 U
2,4-Dichlorophenol		350 U	17000 U	350 U	350 U	330 U	330 U
1,2,4-Trichlorobenzene		350 U	17000 U	58 %	21 * %	330 U	71 %
Naphthalene		350 U	17000 U	350 U	350 U	330 U	330 U
4-Chloroaniline		350 U	17000 U	350 U	350 U	330 U	330 U
Hexachlorobutadiene		350 U	17000 U	350 U	350 U	330 U	330 U
4-Chloro-3-methylphenol		350 U	17000 U	73 %	83 %	330 U	95 %
2-Methylnaphthalene		350 U	17000 U	350 U	350 U	330 U	330 U
Hexachlorocyclopentadiene		350 U	17000 U	350 U	350 U	330 U	330 U
2,4,6-Trichlorophenol		350 U	17000 U	350 U	350 U	330 U	330 U
2,4,5-Trichlorophenol		870 U	44000 U	870 U	870 U	840 U	840 U

*= Outside of EPA CLP QC limits.

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0000026

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8/21/04

RFW Batch Number: 0404L223 Client: TNU-HANFORD F03-018 Work Order: 11343606001 Page: 1b

Cust ID:	B17N52		B17N52		B17N52		B17N52		SBLKMW		SBLKMW BS	
RFW#:	001		001 DL		001 MS		001 MSD		04LE0415-MB1		04LE0415-MB1	
2-Chloronaphthalene	350	U	17000	U	350	U	350	U	330	U	330	U
2-Nitroaniline	870	U J	44000	U J	870	U	870	U	840	U	840	U
Dimethylphthalate	350	U J	17000	U J	350	U	350	U	330	U	330	U
Acenaphthylene	350	U	17000	U	350	U	350	U	330	U	330	U
2,6-Dinitrotoluene	350	U	17000	U J	350	U	350	U	330	U	330	U
3-Nitroaniline	870	U J	44000	U J	870	U	870	U	840	U	840	U
Acenaphthene	350	U	17000	U	72	%	72	%	330	U	79	%
2,4-Dinitrophenol	870	U	44000	U J	870	U	870	U	840	U	840	U
4-Nitrophenol	870	U	44000	U	80	%	88	%	840	U	102	%
Dibenzofuran	350	U	17000	U	350	U	350	U	330	U	330	U
2,4-Dinitrotoluene	350	U	17000	U	71	%	77	%	330	U	84	%
Diethylphthalate	350	U J	17000	U J	350	U	350	U	330	U	330	U
4-Chlorophenyl-phenylether	350	U J	17000	U J	350	U	350	U	330	U	330	U
Fluorene	350	U	17000	U	350	U	350	U	330	U	330	U
4-Nitroaniline	870	U J	44000	U J	870	U	870	U	840	U	840	U
4,6-Dinitro-2-methylphenol	870	U	44000	U	870	U	870	U	840	U	840	U
N-Nitrosodiphenylamine (1)	350	U	17000	U	350	U	350	U	330	U	330	U
4-Bromophenyl-phenylether	350	U J	17000	U J	350	U	350	U	330	U	330	U
Hexachlorobenzene	350	U J	17000	U J	350	U	350	U	330	U	330	U
Pentachlorophenol	870	U	44000	U J	94	%	101	%	840	U	93	%
Phenanthrene	350	U	17000	U	350	U	350	U	330	U	330	U
Anthracene	350	U	17000	U	350	U	350	U	330	U	330	U
Carbazole	350	U	17000	U	350	U	350	U	330	U	330	U
Di-n-Butylphthalate	350	U J	17000	U J	230	JB	210	JB	140	J	120	JB
Fluoranthene	350	U	17000	U	350	U	350	U	330	U	330	U
Pyrene	350	U	17000	U	86	%	95	%	330	U	98	%
Butylbenzylphthalate	350	U	17000	U	350	U	350	U	330	U	330	U
3,3'-Dichlorobenzidine	350	U J	17000	U J	350	U	350	U	330	U	330	U
Benzo(a)anthracene	350	U	17000	U	350	U	350	U	330	U	330	U
Chrysene	350	U	17000	U	350	U	350	U	330	U	330	U
bis(2-Ethylhexyl)phthalate	350	U J	17000	U J	57	J	40	J	330	U	35	J
Di-n-Octyl phthalate	350	U	17000	U	350	U	350	U	330	U	330	U
Benzo(b)fluoranthene	350	U	17000	U	350	U	350	U	330	U	330	U
Benzo(k)fluoranthene	350	U	17000	U	350	U	350	U	330	U	330	U
Benzo(a)pyrene	350	U	17000	U	350	U	350	U	330	U	330	U
Indeno(1,2,3-cd)pyrene	350	U	17000	U	350	U	350	U	330	U	330	U
Dibenzo(a,h)anthracene	350	U	17000	U	350	U	350	U	330	U	330	U
Benzo(g,h,i)perylene	350	U	17000	U	350	U	350	U	330	U	330	U
Tributylphosphate	14000	E	41000	D	16000	E	16000	E	330	U	330	U

(1) - Cannot be separated from Diphenylamine. *= Outside of EPA CLP QC limits.

REVISED Rad 8/23/06

8/21/06

0000017

0000027

RFW Batch Number: 0404L223 Client: TNU-HANFORD F03-018 Work Order: 11343606001 Page: 1b

Cust ID:	B17N52		B17N52		B17N52		B17N52		SBLKMW		SBLKMW BS	
RFW#:	001		001 DL		001 MS		001 MSD		04LE0415-MB1		04LE0415-MB1	
2-Chloronaphthalene	350	U	17000	U	350	U	350	U	330	U	330	U
2-Nitroaniline	870	U	44000	U	870	U	870	U	840	U	840	U
Dimethylphthalate	350	U	17000	U	350	U	350	U	330	U	330	U
Acenaphthylene	350	U	17000	U	350	U	350	U	330	U	330	U
2,6-Dinitrotoluene	350	U	17000	U	350	U	350	U	330	U	330	U
3-Nitroaniline	870	U	44000	U	870	U	870	U	840	U	840	U
Acenaphthene	350	U	17000	U	72	%	72	%	330	U	79	%
2,4-Dinitrophenol	870	U	44000	U	870	U	870	U	840	U	840	U
4-Nitrophenol	870	U	44000	U	80	%	88	%	840	U	102	%
Dibenzofuran	350	U	17000	U	350	U	350	U	330	U	330	U
2,4-Dinitrotoluene	350	U	17000	U	71	%	77	%	330	U	84	%
Diethylphthalate	350	U	17000	U	350	U	350	U	330	U	330	U
4-Chlorophenyl-phenylether	350	U	17000	U	350	U	350	U	330	U	330	U
Fluorene	350	U	17000	U	350	U	350	U	330	U	330	U
4-Nitroaniline	870	U	44000	U	870	U	870	U	840	U	840	U
4,6-Dinitro-2-methylphenol	870	U	44000	U	870	U	870	U	840	U	840	U
N-Nitrosodiphenylamine (1)	350	U	17000	U	350	U	350	U	330	U	330	U
4-Bromophenyl-phenylether	350	U	17000	U	350	U	350	U	330	U	330	U
Hexachlorobenzene	350	U	17000	U	350	U	350	U	330	U	330	U
Pentachlorophenol	870	U	44000	U	94	%	101	%	840	U	93	%
Phenanthrene	350	U	17000	U	350	U	350	U	330	U	330	U
Anthracene	350	U	17000	U	350	U	350	U	330	U	330	U
Carbazole	350	U	17000	U	350	U	350	U	330	U	330	U
Di-n-Butylphthalate	350	U	17000	U	230	JB	210	JB	140	J	120	JB
Fluoranthene	350	U	17000	U	350	U	350	U	330	U	330	U
Pyrene	350	U	17000	U	86	%	95	%	330	U	98	%
Butylbenzylphthalate	350	U	17000	U	350	U	350	U	330	U	330	U
3,3'-Dichlorobenzidine	350	U	17000	U	350	U	350	U	330	U	330	U
Benzo(a)anthracene	350	U	17000	U	350	U	350	U	330	U	330	U
Chrysene	350	U	17000	U	350	U	350	U	330	U	330	U
bis(2-Ethylhexyl)phthalate	350	U	17000	U	57	J	40	J	330	U	35	J
Di-n-Octyl phthalate	350	U	17000	U	350	U	350	U	330	U	330	U
Benzo(b)fluoranthene	350	U	17000	U	350	U	350	U	330	U	330	U
Benzo(k)fluoranthene	350	U	17000	U	350	U	350	U	330	U	330	U
Benzo(a)pyrene	350	U	17000	U	350	U	350	U	330	U	330	U
Indeno(1,2,3-cd)pyrene	350	U	17000	U	350	U	350	U	330	U	330	U
Dibenzo(a,h)anthracene	350	U	17000	U	350	U	350	U	330	U	330	U
Benzo(g,h,i)perylene	350	U	17000	U	350	U	350	U	330	U	330	U
Tributylphosphate	14000	E	41000	D	16000	E	16000	E	330	U	330	U

(1) - Cannot be separated from Diphenylamine. *= Outside of EPA CLP QC limits.

7/6/05

000027

000018

Lionville Laboratory, Inc.

Semivolatiles by GC/MS, Special List   Report Date: 04/20/04 11:31

RFW Batch Number: 0404L223   Client: TNU-HANFORD F03-018   Work Order: 11343606001   Page: 2a

Cust ID: **SBLKMW BSD**

Sample Information	RFW#:	04LE0415-MB1	
	Matrix:	SOIL	
	D.F.:	1.00	
	Units:	ug/Kg	
	Nitrobenzene-d5	80	%
Surrogate Recovery	2-Fluorobiphenyl	84	%
	p-Terphenyl-d14	108	%
	Phenol-d5	88	%
	2-Fluorophenol	84	%
	2,4,6-Tribromophenol	95	%

		fl
Phenol	87	%
bis(2-Chloroethyl)ether	330	U
2-Chlorophenol	80	%
1,3-Dichlorobenzene	330	U
1,4-Dichlorobenzene	67	%
1,2-Dichlorobenzene	330	U
2-Methylphenol	330	U
2,2'-oxybis(1-Chloropropane)	330	U
3- and/or 4-Methylphenol	330	U
N-Nitroso-Di-n-propylamine	84	%
Hexachloroethane	330	U
Nitrobenzene	330	U
Isophorone	330	U
2-Nitrophenol	330	U
2,4-Dimethylphenol	330	U
bis(2-Chloroethoxy)methane	330	U
2,4-Dichlorophenol	330	U
1,2,4-Trichlorobenzene	71	%
Naphthalene	330	U
4-Chloroaniline	330	U
Hexachlorobutadiene	330	U
4-Chloro-3-methylphenol	101	%
2-Methylnaphthalene	330	U
Hexachlorocyclopentadiene	330	U
2,4,6-Trichlorophenol	330	U
2,4,5-Trichlorophenol	840	U

*= Outside of EPA CLP QC limits.

7/10/05

000019

000028

RFW#: 04LE0415-MB1

2-Chloronaphthalene	330	U
2-Nitroaniline	840	U
Dimethylphthalate	330	U
Acenaphthylene	330	U
2,6-Dinitrotoluene	330	U
3-Nitroaniline	840	U
Acenaphthene	84	%
2,4-Dinitrophenol	840	U
4-Nitrophenol	99	%
Dibenzofuran	330	U
2,4-Dinitrotoluene	85	%
Diethylphthalate	330	U
4-Chlorophenyl-phenylether	330	U
Fluorene	330	U
4-Nitroaniline	840	U
4,6-Dinitro-2-methylphenol	840	U
N-Nitrosodiphenylamine (1)	330	U
4-Bromophenyl-phenylether	330	U
Hexachlorobenzene	330	U
Pentachlorophenol	101	%
Phenanthrene	330	U
Anthracene	330	U
Carbazole	330	U
Di-n-Butylphthalate	99	JB
Fluoranthene	330	U
Pyrene	99	%
Butylbenzylphthalate	330	U
3,3'-Dichlorobenzidine	330	U
Benzo(a)anthracene	330	U
Chrysene	330	U
bis(2-Ethylhexyl)phthalate	330	U
Di-n-Octyl phthalate	330	U
Benzo(b)fluoranthene	330	U
Benzo(k)fluoranthene	330	U
Benzo(a)pyrene	330	U
Indeno(1,2,3-cd)pyrene	330	U
Dibenzo(a,h)anthracene	330	U
Benzo(g,h,i)perylene	330	U
Tributylphosphate	330	U

(1) - Cannot be separated from Diphenylamine. *= Outside of EPA CLP QC limits.

7/10/05

020000

020000

Lionville Laboratory, Inc.
DIESEL RANGE ORGANICS BY GC

Report Date: 09/14/05 09:50

RFW Batch Number: 0404L223 Client: TNUHANFORD F03-018 H2556 Work Order: 11343606001 Page: 1

	Cust ID:	B17N52	B17N52	BLK	BLK BS	BLK BSD
Sample Information	RFW#:	001	001 MS	04LE0473-MB1	04LE0473-MB1	04LE0473-MB1
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00
	Units:	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
	p-Terphenyl	71 %	75 %	67 %	74 %	69 %
		fl	fl	fl	fl	fl
Diesel Range Organics		20900 U R	64 %	12000 U	74 %	72 %
Kerosene		20900 U R	20900 U	12000 U	12000 U	12000 U

K 7/[illegible]05 9/20/05

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked.
%= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

000021

Sep. 14. 2005 4:11PM

No. 1914 P. 1

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Client: TNU HANFORD F03-018
LVL#: 0404L223
SDG/SAF#: H2556/F03-018

W.O.#: 11343-606-001-9999-00
Date Received: 04-02-2004

SEMIVOLATILE

One (1) soil sample was collected on 03-23-2004.

The sample and its associated QC samples were extracted according to Lionville Laboratory SOPs based on method 3550 on 04-05-2004 and analyzed according to criteria set forth in Lionville Laboratory SOPs based on SW 846 Method 8270C for client specified Semivolatile target compounds on 04-07,08,12-2004.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from a sample that met LvLI's sample acceptance policy.
2. The sample was extracted and analyzed within required holding time.
3. Non-target compounds were detected in the sample.
4. The sample required a 50-fold dilution due to high levels of target compounds.
5. One (1) of forty (40) obtainable surrogate recoveries was outside EPA QC limits. The analysis of associated matrix spike duplicate fulfills the reanalysis requirement of sample B17N52 MS.
6. Three (3) of twenty-two (22) matrix spike recoveries were outside EPA QC limits.
7. All blank spike recoveries were within EPA QC limits.
8. The method blank contained the common laboratory contaminant Di-n-butylphthalate at a level less than the CRQL.
9. Internal standard area and retention time criteria were met.
10. Manual integrations are performed according to SOP QA-125 to produce quality data with the utmost integrity. All manual integrations are required to be technically valid and properly documented. Appropriate technical flags are defined in the Glossary ("Technical Flags For Manual Integration").
11. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

J. Michael Taylor
President
Lionville Laboratory Incorporated

04-27-04
Date

som\gorup\data\bna\tnu-hanford-0404-223.doc

208 Welsh Pool Road • Exton, PA 19341-1313 • (610) 280-3000 • Fax (610) 280-3041

LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU-HANFORD F03-018
LVL #: 0404L223
SDG/SAF #: H2556/F03-018

W.O. #: 11343-606-001-9999-00
Date Received: 04-02-04

DIESEL RANGE ORGANICS

One (1) soil sample was collected on 03-23-04.

The sample and the associated QC samples were extracted on 04-16-04 and analyzed according to Lionville Laboratory SOPs based on SW846, 3rd Edition procedures on 05-06-04. The extraction procedure was based on method 3540C and the extracts were analyzed based on method 8015. The analysis met the intent of method WTPH-D.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from samples that met LvLI's sample acceptance policy.

2. These samples were extracted nine days outside of recommended hold time. A copy of the Sample Discrepancy Report (SDR) has been enclosed.

3. The method blank was below the reporting limits for all target compounds.

4. All surrogate recoveries were within acceptance criteria.

5. All blank spike recoveries were within acceptance criteria.

6. The matrix spike recovery was within acceptance criteria.

   Due to insufficient sample volume, the matrix spike duplicate could not be performed on any samples in this data set. However, blank spike and matrix spike were performed with these samples to demonstrate that systems were in control. A copy of the Sample Discrepancy Report (SDR) has been enclosed.

7. All initial calibrations associated with this data set were within acceptance criteria.

8. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.

9. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the laboratory Manager or a designee, as verified by the following signature.

5/12/04
Date

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

pef\r:\group\data\dro\tnu hanford\04L-223.doc

Lionville Laboratory Sample Discrepancy Report (SDR)

SDR #: 041303

Initiator: Bryce Sanford
Date: 5/11/04
Client: TVU

Batch: 0404L223
Samples: 001
Method: SW846/MCAWW/CLP/

Parameter: OORO
Matrix: Soil
Prep Batch: 04LE0423

1. Reason for SDR

a. COC Discrepancy __ Tech Profile Error __ Client Request __ Sampler Error on C-O-C __ Transcription Error __ Wrong Test Code __ Other _____

b. General Discrepancy

__ Missing Sample/Extract* __ Container Broken __ Wrong Sample Pulled __ Label ID's Illegible
__ Hold Time Exceeded __ Insufficient Sample* __ Preservation Wrong __ Received Past Hold
__ Improper Bottle Type __ Not Amenable to Analysis

Note*: Verified by [Log-In] or [Prep Group] (circle)...signature/date: _____

c. Problem (Include all relevant specific results; attach data if necessary)

(1) Insufficient sample to perform MS and MSD. Sample and MS were extracted with a limited weight (15g instead of 25g).

(2) Samples extracted 9 days past hold

2. Known or Probable Causes(s)

3. Discussion and Proposed Action Other Description: Narrate

__ Re-log
__ Entire Batch
__ Following Samples: _____
__ Re-leach
__ Re-extract
__ Re-digest
__ Revise EDD
__ Change Test Code to _____
__ Place On/Take Off Hold (circle)

4. Project Manager Instructions...signature/date: 5/11/04

√ Concur with Proposed Action
__ Disagree with Proposed Action; See Instruction
__ Include in Case Narrative
__ Client Contacted:
Date/Person _____
__ Add
__ Cancel

5. Final Action...signature/date: 5/11/04 Other Explanation:

__ Verified re-[log][leach][extract][digest][analysis] (circle)
√ Included in Case Narrative
__ Hard Copy COC Revised
__ Electronic COC Revised
__ EDD Corrections Completed

When Final Action has been recorded, forward original to QA Specialist for distribution and filing.

Route	Distribution of Completed SDR	Route	Distribution of Completed SDR
__	X Initiator	__	__ Metals: Beegle
__	X Lab General Manager: M. Taylor	__	__ Inorganic: Perrone
√	X Project Mgr: Stone/Johnson/Haslett	__	__ GC/LC: Kiger
__	X Technical Mgr: Wesson/Daniels	__	__ MS: Rychlak/Layman
__	X QA (file): Alberts	__	__ Log-in: Melnic
__	__ Data Management: Feldman	__	__ Admin: Soos
__	__ Sample Prep: Beegle/Kiger	__	__ Other: _____

SV

Lionville Laboratory, Inc.
DRO ANALYTICAL DATA PACKAGE FOR
TNUHANFORD F03-018 H2556

DATE RECEIVED: 04/02/04 LVL LOT # :0404L223

CLIENT ID	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B17N52	001	S	04LE0473	03/23/04	04/16/04	05/06/04
B17N52	001 MS	S	04LE0473	03/23/04	04/16/04	05/06/04
LAB QC:						
BLK	MB1	S	04LE0473	N/A	04/16/04	05/06/04
BLK	MB1 BS	S	04LE0473	N/A	04/16/04	05/06/04
BLK	MB1 BSD	S	04LE0473	N/A	04/16/04	05/06/04

FLUOR Hanford Inc.	CENTRAL PLATEAU CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F03-018-079	Page 1 of 1
Collector Pope/Pfister/Hughes	Company Contact / Telephone No. Steve Trent 373-5869	Project Coordinator TRENT, SJ	Price Code 8N Air Quality ☐
Project Designation 216-Z-9 Trench Characterization Borehole - Soil	Sampling Location 216-Z-9/C3426 - Interval 90'-92.5'	SAF No. F03-018	Data Turnaround 45 Days
Ice Chest No.	Field Logbook No. HNF-N-3361 / COA 119152ES10	Method of Shipment Federal Express	
Shipped To MAB 3/29/04 ~~EBERLINE SERVICES (Formerly TMA)~~ RECRA	Offsite Property No. See RSR	Bill of Lading/Air Bill No. See RSR	

POSSIBLE SAMPLE HAZARDS/REMARKS

RADIOACTIVE TIE TO:) B17NN0

Special Handling and/or Storage

SAMPLERS: Fill VOA vials with Zero head space.

Preservation	Cool 4C	Cool 4C	Cool 4C	Cool 4C MAB 3/30/04	None MAB 3/29/04	Cool 4C					
Type of Container	aGs*	aG	aG	aG	aG	aG					
No. of Container(s)	3	1	1	1	1	1					
Volume	40mL	60mL	120mL	120mL	60mL	60mL					
SAMPLE ANALYSIS	See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions.	See item (4) in Special Instructions.	See item (5) in Special Instructions.	TOC - 415.1; TIC - 415.1M					
Sample No. / Matrix * / Sample Date / Sample Time											
B17N52 / SOIL / 03/23/04 / 0835	X	X	X	X		X					

CHAIN OF POSSESSION

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
J. POPE	3/23/04 1210	SAMPLE FRIDGE TRAILER	3/23/04 1230
Sample Fridge Trailer	4/1/04 0745	Greg Thomas/Mug Flores	4/1/04 0745
Greg Thomas/Mug Flores	4/1/04	FED EX	
FED EX	4.2.04 0945		4.2.04 0945

SPECIAL INSTRUCTIONS

(1) VOA - 8260A (TCL); VOA - 8260A (Add-On) {1-Butanol, Acetonitrile, cis-1,2-Dichloroethylene, Hexane, n-Butylbenzene, trans-1,2-Dichloroethylene}
(2) Semi-VOA - 8270A (TCL); Semi-VOA – 8270A (Add-On) {1,2,4-Trimethylbenzene, Cyclohexanone, Tributyl phosphate}; TPH-Diesel Range - WTPH-D {Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range}
(3) ICP Metals - 6010A (TAL); ICP Metals - 6010A (Add-on) {Arsenic, Beryllium, Bismuth, Lead, Lithium, Phosphorus, Selenium, Strontium}; Mercury - 7471 - (CV)
(4) IC Anions - 300.0 {Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate}; Ammonia - 350.3; Total Cyanide - 9010; pH (Soil) - 9045; NO2/NO3 - 353.2; Soil Cation Exchange Capacity - 9080; Sulfides - 9030; Chromium Hex - 7196; Oil & Grease - 413.1
(5) Gross Alpha; Gross Beta; Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-on {Antimony-125, Cesium-134}; Americium-241; Isotopic Plutonium; Isotopic Uranium; Total Uranium

Matrix *
S=Soil
SE=Sediment
SO=Solid
SL=Sludge
W = Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
Wi=Wipe
L=Liquid
V=Vegetation
X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

A-6003-618(03/03)

Appendix 5

Data Validation Supporting Documentation

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 216-Z-9			DATA PACKAGE: H2556		
VALIDATOR: TLI		LAB: LI		DATE: 7/2/05	
			SDG: H2556		
ANALYSES PERFORMED					
SW-846 8260		SW-846 8260 (TCLP)	SW-846 8270	Diesel + Kerosene	SW-846 8270 (TCLP)
SAMPLES/MATRIX					
B17N52		B17N52 DL (re-run)			
					Soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? ..... Yes (No) N/A

Comments: _____

2. INSTRUMENT TUNING AND CALIBRATION (Levels D and E)

GC/MS tuning/performance check acceptable? ..... Yes No (N/A)

Initial calibrations acceptable? ..... Yes No (N/A)

Continuing calibrations acceptable? ..... Yes No (N/A)

Standards traceable? ..... Yes No (N/A)

Standards expired? ..... Yes No (N/A)

Calculation check acceptable? ..... Yes No (N/A)

Comments: _____

GC/MS ORGANIC DATA VALIDATION CHECKLIST

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E) ..... Yes No (N/A)
Calibration blank results acceptable? (Levels D, E) ..... Yes No (N/A)
Laboratory blanks analyzed? ..... (Yes) No N/A
Laboratory blank results acceptable? ..... (Yes) No N/A
Field/trip blanks analyzed? (Levels C, D, E) ..... Yes (No) N/A
Field/trip blank results acceptable? (Levels C, D, E) ..... Yes No (N/A)
Transcription/calculation errors? (Levels D, E) ..... Yes No (N/A)
Comments: no FB

4. ACCURACY (Levels C, D, and E)

Surrogates/system monitoring compounds analyzed? ..... (Yes) No N/A
Surrogate/system monitoring compound recoveries acceptable? ..... Yes (No) N/A
Surrogates traceable? (Levels D, E) ..... Yes No (N/A)
Surrogates expired? (Levels D, E) ..... Yes No (N/A)
MS/MSD samples analyzed? ..... (Yes) No N/A
MS/MSD results acceptable? ..... Yes (No) N/A
MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No (N/A)
MS/MSD standards? (Levels D, E) ..... Yes No (N/A)
LCS/BSS samples analyzed? ..... (Yes) No N/A
LCS/BSS results acceptable? ..... Yes (No) N/A
Standards traceable? (Levels D, E) ..... Yes No (N/A)
Standards expired? (Levels D, E) ..... Yes No (N/A)
Transcription/calculation errors? (Levels D, E) ..... Yes No (N/A)
Performance audit sample(s) analyzed? ..... Yes (No) N/A
Performance audit sample results acceptable? ..... Yes No (N/A)

Comments: Surr B17W52DL – nitrobenzene + tribromophenol – J all associate
MS 4 out – chlorophenol dichlorobenzene n n-dipropylam + trichlorophenol
MSD ↓ " " " "
↳ phen phenol J all assoc
LCS – dichlorobenz – J all assoc
no diesel + ~~kerosene~~ MSD – J all diesel + ~~kerosene~~ – MS L420 J all no pAS

GC/MS ORGANIC DATA VALIDATION CHECKLIST

5. PRECISION (Levels C, D, and E)

MS/MSD samples analyzed? ..... (Yes) No N/A
MS/MSD RPD values acceptable? ..... Yes (No) N/A
MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No (N/A)
MS/MSD standards expired? (Levels D, E) ..... Yes No (N/A)
Field duplicate RPD values acceptable? ..... Yes No (N/A)
Field split RPD values acceptable? ..... Yes No (N/A)
Transcription/calculation errors? (Levels D, E) ..... Yes No (N/A)

Comments: dichlorobenzene - 164% - J all
n-nitroso - 72% - J all
trichlorobenz - 93% - J all

no Dias/~~RPD~~ Error MS/MSD - J all

6. SYSTEM PERFORMANCE (Levels D and E)

Internal standards analyzed? ..... Yes No (N/A)
Iinternal standard areas acceptable? ..... Yes No (N/A)
Internal standard retention times acceptable? ..... Yes No (N/A)
Standards traceable? ..... Yes No (N/A)
Standards expired? ..... Yes No (N/A)
Transcription/calculation errors? ..... Yes No (N/A)

Comments:

7. HOLDING TIMES (all levels)

Samples properly preserved? ..... (Yes) No N/A
Sample holding times acceptable? ..... Yes (No) N/A

Comments: ~~SV~~ >2x - J ~~all~~ 1/24
DRO/~~RRO~~ Error >2x - R all

GC/MS ORGANIC DATA VALIDATION CHECKLIST

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E)	Yes	No	(N/A)
Compound quantitation acceptable? (Levels D, E)	Yes	No	(N/A)
Results reported for all requested analyses?	(Yes)	No	N/A
Results supported in the raw data? (Levels D, E)	Yes	No	(N/A)
Samples properly prepared? (Levels D, E)	Yes	No	(N/A)
Laboratory properly identified and coded all TIC? (Levels D, E)	Yes	No	(N/A)
Detection limits meet RDL?	Yes	(No)	N/A
Transcription/calculation errors? (Levels D, E)	Yes	No	(N/A)

Comments: DRO & [illegible] one
[illegible]

9. SAMPLE CLEANUP (Levels D and E)

GPC cleanup performed?	Yes	No	N/A
GPC check performed?	Yes	No	N/A
GPC check recoveries acceptable?	Yes	No	N/A
GPC calibration performed?	Yes	No	N/A
GPC calibration check performed?	Yes	No	N/A
GPC calibration check retention times acceptable?	Yes	No	N/A
Check/calibration materials traceable?	Yes	No	N/A
Check/calibration materials Expired?	Yes	No	N/A
Analytical batch QC given similar cleanup?	Yes	No	N/A
Transcription/Calculation Errors?	Yes	No	N/A

Comments:

Date: 23 September 2005
To: Fluor Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 216-Z-9 Trench Characterization Borehole - Soil
Subject: Inorganics - Data Package No. H2556

INTRODUCTION

This memo presents the results of data validation on Data Package No. H2556 prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample	Media	Validation	Analysis
B17N52	3/23/04	Soil	C	See note 1

1 - ICP metals by 6010B and mercury by 7471A.

Data validation was conducted in accordance with the FHI validation statement of work and the Plutonium/Organic-rich Process Condensate/Process Waste Group Operable Unit Representative Sites Sampling and Analysis Plan, DOE/RL-2001, Rev. 0. Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation
Appendix 6. Additional Documentation Requested by Client

DATA QUALITY PARAMETERS

- **Holding Times**

Analytical holding times for metals are assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be analyzed within 6 months for ICP metals and 28 days for mercury.

All holding times were acceptable.

· **Preparation (Method) Blanks**

Preparation Blanks

At least one preparation blank, consisting of deionized distilled water processed through each sample preparation and analysis procedure, must be prepared and analyzed with every sample delivery group. In the case of positive blank results, samples with digestate concentrations less than five times the preparation blank value have had their associated values qualified as non-detected and flagged "U". Samples with concentrations of greater than five times the highest blank concentration do not require qualification.

In the case of negative blank results, if the absolute value exceeds the contract required detection limit (CRDL), all nondetects are rejected and flagged "UR" and all detects that are less than ten times the absolute value of the associated preparation blank result are qualified as estimates and flagged "J". If the absolute value of the negative preparation blank is greater than the instrument detection limit (IDL) and less than or equal to the CRDL, all nondetects are qualified as estimates and flagged "UJ" and all detects less than ten times the absolute value of the blank are qualified as estimates and flagged "J". If the sample results are greater than ten times the absolute value of the preparation blank, no qualification is necessary.

All preparation blank results were acceptable.

Field (Equipment) Blank

No field blanks were submitted for analysis.

· **Accuracy**

Matrix Spike & Matrix Spike Duplicate

Matrix spike (MS), matrix spike duplicate (MSD) and laboratory control sample (LCS) analyses are used to assess the analytical accuracy of the reported data. The matrix spike is used to assess effect of the matrix on the ability to accurately quantify sample concentrations. Recoveries must fall within the range of 70% to 130%. Samples with a spike recovery of less than 30% and a sample result below the IDL are rejected and flagged "UR". Samples with a spike recovery of 30% to 69% and a sample result less than the IDL are qualified "UJ". Samples with a spike recovery of greater than 130% or less than 69% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a spike recovery greater than 130% and a sample result less than the IDL, no qualification is required.

Due to a matrix spike recovery outside QC limits (63%), the antimony result was qualified as an estimate and flagged "J".

All other MS/MSD results were acceptable.

Laboratory Control Sample

The LCS is used to monitor the overall performance of all steps in the analysis. Recoveries must fall within the range of 70% to 130% for LCS analysis. Samples with a recovery of less than 50% are rejected and flagged "UR". Samples with a recovery of 50% to 69% and a sample recovery below the IDL are qualified "UJ". Samples with a recovery of greater than 130% or less than 70% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a recovery greater than 130% and a sample result less than the IDL, no qualification is required.

All LCS results were acceptable.

- **Precision**

Laboratory Duplicate Samples

Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of matrix spike and matrix spike duplicate (MSD) analyses performed on a sample in the analytical batch. Precision may alternatively be assessed using unspiked duplicate analyses performed on a sample in the analytical batch. If both sample and replicate activities (concentrations) are greater than five times the CRDL and the RPD is less than +/- 30%, no qualification is required. If either activity (concentration) is less than five times the CRDL, the RPD control limit is less than or equal to two times the CRDL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

All laboratory duplicate results were acceptable.

Field Duplicate

No field duplicate results were submitted for analysis.

- **Analytical Detection Limits**

Reported analytical detection levels are compared against the required target quanitiation limits (RTQLs) to ensure that laboratory detection levels meet the required criteria. All results met the analyte specific RTQL.

- **Completeness**

Data package No. H2556 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to a matrix spike recovery outside QC limits (63%), the antimony result was qualified as an estimate and flagged "J". Data flagged "J" is an estimate, but under the FHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

FHI, Contract #20266, *Validation Statement of Work*, Fluor Hanford Incorporated, July 7, 2003.

DOE/RL-2001, Rev. 0, *Plutonium/Organic-rich Process Condensate/Process Waste Group Operable Unit Representative Sites Sampling and Analysis Plan.*

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with FHI validation SOW are as follows:

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.

BJ - Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

METALS DATA QUALIFICATION SUMMARY*

SDG: H2556	REVIEWER: TLI	PROJECT: 216-Z-9	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Antimony	J	All	MS recovery

* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

Project: FLUOR HANFORD			
Laboratory: LLI			
Case	SDG: H2556		
Sample Number		B17N52	
Remarks			
Sample Date		3/23/04	
Inorganics		Result	Q
Silver	2	0.06	U
Aluminum		6710	
Arsenic	20	6.4	
Barium	10	52.1	
Beryllium		0.39	
Bismuth	10	0.26	U
Calcium		7940	
Cadmium	0.5	40.2	
Cobalt		6.1	
Chromium	1	12.2	
Copper	2.5	11.8	
Iron		15300	
Mercury	0.2	0.02	U
Potassium		1510	
Lithium		10.1	
Magnesium		4790	
Manganese		353	
Sodium		648	
Nickel		11.6	
Phosphorous	4	476	
Lead	10	5.2	
Antimony	10	0.27	UJ
Selenium		0.34	U
Strontium	10	25.3	
Vanadium		30.6	
Zinc		35.4	

0000010

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results. All other qualifiers shown were applied during validation.

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Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 05/20/04

CLIENT: TNUHANFORD F03-018 H2556 LVL LOT #: 0404L223

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B17N52	Silver, Total	0.06 u	MG/KG	0.06	1.0
		Aluminum, Total	6710	MG/KG	3.5	1.0
		Arsenic, Total	6.4	MG/KG	0.34	1.0
		Barium, Total	52.1	MG/KG	0.02	1.0
		Beryllium, Total	0.39	MG/KG	0.02	1.0
		Bismuth, Total	0.26 u	MG/KG	0.26	1.0
		Calcium, Total	7940	MG/KG	2.1	1.0
		Cadmium, Total	40.2	MG/KG	0.04	1.0
		Cobalt, Total	6.1	MG/KG	0.06	1.0
		Chromium, Total	12.2	MG/KG	0.05	1.0
		Copper, Total	11.8	MG/KG	0.12	1.0
		Iron, Total	15300	MG/KG	0.30	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Potassium, Total	1510	MG/KG	1.1	1.0
		Lithium, Total	10.1	MG/KG	0.01	1.0
		Magnesium, Total	4790	MG/KG	0.40	1.0
		Manganese, Total	353	MG/KG	0.01	1.0
		Sodium, Total	648	MG/KG	3.1	1.0
		Nickel, Total	11.6	MG/KG	0.10	1.0
		Phosphorus, Total	476	MG/KG	10.1	1.0
		Lead, Total	5.2	MG/KG	0.20	1.0
		Antimony, Total	0.27 u J	MG/KG	0.27	1.0
		Selenium, Total	0.34 u	MG/KG	0.34	1.0
		Strontium, Total	25.3	MG/KG	0.01	1.0
		Vanadium, Total	30.6	MG/KG	0.05	1.0
		Zinc, Total	35.4	MG/KG	0.04	1.0

7/10/05

0000043

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Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU-HANFORD F03-018
LVL#: 0404L223
SDG/SAF#: H2556/F03-018

W.O.#: 11343-606-001-9999-00
Date Received: 04-02-04

METALS CASE NARRATIVE

1. This narrative covers the analyses of 1 soil sample.

2. The sample was prepared and analyzed in accordance with methods checked on the attached glossary.

3. All analyses were performed within the required holding times.

4. All results presented in this report are derived from samples that met LvLI's sample acceptance policy.

5. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within the 90-110% control limits (80-120% for Mercury).

6. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within control limits (less than the PQL).

7. All preparation/method blanks (MB) were within method criteria {less than the Practical Quantitation Limit (3X the IDL), or samples greater than 20X MB value}. Refer to the Inorganics Method Blank Data Summary.

8. All ICP Interference Check Standards were within control limits.

9. All laboratory control samples (LCS) were within the 80-120% control limits. Refer to the Inorganics Laboratory Control Standards Report.

10. The matrix spike (MS) recoveries for 4 analytes were outside the 75-125% control limits. Refer to the Inorganics Accuracy Report.

11. For analytes where the ICP MS is out-of-control, a post-digestion MS (PDS) and serial dilution are performed. A PDS was prepared at meaningful concentration level for the following analytes:

8 Welsh Pool Road • Exton, PA 19341- 1313 • (610) 280-3000 • Fax (610) 280-3041

Sample ID	Element	PDS Concentration (ppb)	PDS % Recovery
B17N52	Aluminum	20,000	99.3
	Cadmium	200	137
	Iron	40,000	88
	Antimony	100	110

12. The duplicate analysis for 1 analyte was outside the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.

13. For the purposes of this report, the data has been reported to the Instrument Detection Limit (IDL). Values between the IDL and the Practical Quantitation Limit (PQL) are acquired in a region of less-certain quantification.

14. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

05-23-04
Date

jjw/m04-223

LIONVILLE LABORATORY INC.

0000040

6

FLUOR Hanford Inc.	CENTRAL PLATEAU CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F03-018-079	Page 1 of 1

Collector Pope/Pfister/Hughes	Company Contact Steve Trent	Telephone No. 373-5869	Project Coordinator TRENT, SJ
Project Designation 216-Z-9 Trench Characterization Borehole - Soil	Sampling Location 216-Z-9/C3426 - Interval 90'-92.5'		SAF No. F03-018
Ice Chest No.	Field Logbook No. HNF-N-3361	COA 119152ES10	Method of Shipment Federal Express
Shipped To ~~EBERLINE SERVICES (Formerly TMA)~~ MAB 3/21/04 RECRA	Offsite Property No. See RSR		Bill of Lading/Air Bill No. See RSR

Price Code 8N

Air Quality ☐

Data Turnaround 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

RADIOACTIVE TIE TO:) B17NN0

Special Handling and/or Storage

SAMPLERS: Fill VOA vials with Zero head space.

Preservation	Cool 4C	Cool 4C	Cool 4C	Cool 4C ~~None~~ MAB 3/30/04	~~None~~	Cool 4C					
Type of Container	aGs*	aG	aG	aG	~~aG~~	aG					
No. of Container(s)	3	1	1	1	~~1~~	1					
Volume	40mL	60mL	120mL	120mL	~~60mL~~	60mL					
SAMPLE ANALYSIS	See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions.	See item (4) in Special Instructions.	~~See item (5) in Special Instructions.~~	TOC - 415.1; TIC - 415.1M					

(Column 5 crossed out, initialed MAB 3/30/04)

Sample No.	Matrix *	Sample Date	Sample Time										
B17N52	SOIL	03/23/04	0835	X	X	X	X		X				

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
T. POPE / [signature]	3/23/04 1210	Sample Fridge Trailer	3/23/04 1210
Sample Fridge Trailer	4/1/04 0745	Greg Thomas / [signature]	4/1/04 0745
Greg Thomas / [signature]	4/1/04 0745	FED EX	
Fed Ex	4-2-04 / 0945	[signature]	4-2-04 / 0945

SPECIAL INSTRUCTIONS

(1) VOA - 8260A (TCL); VOA - 8260A (Add-On) {1-Butanol, Acetonitrile, cis-1,2-Dichloroethylene, Hexane, n-Butylbenzene, trans-1,2-Dichloroethylene}
(2) Semi-VOA - 8270A (TCL); Semi-VOA – 8270A (Add-On) {1,2,4-Trimethylbenzene, Cyclohexanone, Tributyl phosphate}; TPH-Diesel Range - WTPH-D {Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range}
(3) ICP Metals - 6010A (TAL); ICP Metals - 6010A (Add-on) {Arsenic, Beryllium, Bismuth, Lead, Lithium, Phosphorus, Selenium, Strontium}; Mercury - 7471 - (CV)
(4) IC Anions - 300.0 {Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate}; Ammonia - 350.3; Total Cyanide - 9010; pH (Soil) - 9045; NO2/NO3 - 353.2; Soil Cation Exchange Capacity - 9080; Sulfides - 9030; Chromium Hex - 7196; Oil & Grease - 413.1
(5) Gross Alpha; Gross Beta; Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-on {Antimony-125, Cesium-134}; Americium-241; Isotopic Plutonium; Isotopic Uranium; Total Uranium

Matrix *
S=Soil
SE=Sediment
SO=Solid
SL=Sludge
W=Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

A-6003-618(03/03)

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Appendix 5

Data Validation Supporting Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 216-Z-9			DATA PACKAGE: H2556		
VALIDATOR: TCB		LAB: LLI		DATE: 7/2/05	
			SDG: H2556		
ANALYSES PERFORMED					
SW-846/ICP	SW-846/GFAA	SW-846/Hg	SW-846 Cyanide		
SAMPLES/MATRIX					
B17N52					
					Soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? ..... Yes No N/A

Comments: _____

2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations performed on all instruments? ..... Yes No N/A

Initial calibrations acceptable? ..... Yes No N/A

ICP interference checks acceptable? ..... Yes No N/A

ICV and CCV checks performed on all instruments? ..... Yes No N/A

ICV and CCV checks acceptable? ..... Yes No N/A

Standards traceable? ..... Yes No N/A

Standards expired? ..... Yes No N/A

Calculation check acceptable? ..... Yes No N/A

Comments: _____

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

3. BLANKS (Levels B, C, D, and E)

ICB and CCB checks performed for all applicable analyses? (Levels D, E) ..... Yes No (N/A)
ICB and CCB results acceptable? (Levels D, E) ..... Yes No (N/A)
Laboratory blanks analyzed? ..... (Yes) No N/A
Laboratory blank results acceptable? ..... (Yes) No N/A
Field blanks analyzed? (Levels C, D, E) ..... Yes (No) N/A
Field blank results acceptable? (Levels C, D, E) ..... Yes No (N/A)
Transcription/calculation errors? (Levels D, E) ..... Yes No (N/A)
Comments: NO FB

4. ACCURACY (Levels C, D, and E)

MS/MSD samples analyzed? ..... (Yes) No N/A
MS/MSD results acceptable? ..... Yes (No) N/A
MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No (N/A)
MS/MSD standards expired? (Levels D, E) ..... Yes No (N/A)
LCS/BSS samples analyzed? ..... (Yes) No N/A
LCS/BSS results acceptable? ..... (Yes) No N/A
Standards traceable? (Levels D, E) ..... Yes No (N/A)
Standards expired? (Levels D, E) ..... Yes No (N/A)
Transcription/calculation errors? (Levels D, E) ..... Yes No (N/A)
Performance audit sample(s) analyzed? ..... Yes (No) N/A
Performance audit sample results acceptable? ..... Yes No (N/A)
Comments: M7 Cadmium - 69% - Jall 7/10/02
Antimony - 63% - Jall NO PAS

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

5. PRECISION (Levels C, D, and E)

Duplicate RPD values acceptable?	Yes	No	N/A
Duplicate results acceptable?	Yes	No	N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes	No	N/A
MS/MSD standards expired? (Levels D, E)	Yes	No	N/A
Field duplicate RPD values acceptable?	Yes	No	N/A
Field split RPD values acceptable?	Yes	No	N/A
Transcription/calculation errors? (Levels D, E)	Yes	No	N/A

Comments: _____

6. ICP QUALITY CONTROL (Levels D and E)

ICP serial dilution samples analyzed?	Yes	No	N/A
ICP serial dilution %D values acceptable?	Yes	No	N/A
ICP post digestion spike required?	Yes	No	N/A
ICP post digestion spike values acceptable?	Yes	No	N/A
Standards traceable?	Yes	No	N/A
Standards expired?	Yes	No	N/A
Transcription/calculation errors?	Yes	No	N/A

Comments: _____

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

7. FURNACE AA QUALITY CONTROL (Levels D and E)

Duplicate injections performed as required?	Yes	No	N/A
Duplicate injection %RSD values acceptable?	Yes	No	N/A
Analytical spikes performed as required?	Yes	No	N/A
Analytical spike recoveries acceptable?	Yes	No	N/A
Standards traceable?	Yes	No	N/A
Standards expired?	Yes	No	N/A
MSA performed as required?	Yes	No	N/A
MSA results acceptable?	Yes	No	N/A
Transcription/calculation errors?	Yes	No	N/A

Comments: _____

8. HOLDING TIMES (all levels)

Samples properly preserved?	Yes	No	N/A
Sample holding times acceptable?	Yes	No	N/A

Comments: _____

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

9. RESULT QUANTITATION AND DETECTION LIMITS (all levels)

Results reported for all requested analyses?	(Yes)	No	N/A
Rresults supported in the raw data? (Levels D, E)	Yes	No	(N/A)
Samples properly prepared? (Levels D, E)	Yes	No	(N/A)
Detection limits meet RDL?	(Yes)	No	N/A
Transcription/calculation errors? (Levels D, E)	Yes	No	(N/A)

Comments:

Appendix 6

Additional Documentation Requested by Client

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 05/20/04

CLIENT: TNUHANFORD F03-018 H2556 LVL LOT #: 0404L223
WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK1	04L0277-MB1	Silver, Total	0.06 u	MG/KG	0.06	1.0
		Aluminum, Total	3.7	MG/KG	3.4	1.0
		Arsenic, Total	0.34 u	MG/KG	0.34	1.0
		Barium, Total	0.06	MG/KG	0.02	1.0
		Beryllium, Total	0.02 u	MG/KG	0.02	1.0
		Bismuth, Total	0.26 u	MG/KG	0.26	1.0
		Calcium, Total	4.8	MG/KG	2.1	1.0
		Cadmium, Total	0.04 u	MG/KG	0.04	1.0
		Cobalt, Total	0.06 u	MG/KG	0.06	1.0
		Chromium, Total	0.11	MG/KG	0.05	1.0
		Copper, Total	0.12 u	MG/KG	0.12	1.0
		Iron, Total	1.2	MG/KG	0.30	1.0
		Potassium, Total	4.7	MG/KG	1.1	1.0
		Lithium, Total	0.03	MG/KG	0.01	1.0
		Magnesium, Total	2.0	MG/KG	0.39	1.0
		Manganese, Total	0.05	MG/KG	0.01	1.0
		Sodium, Total	3.6	MG/KG	3.0	1.0
		Nickel, Total	0.10 u	MG/KG	0.10	1.0
		Phosphorus, Total	0.76 u	MG/KG	0.76	1.0
		Lead, Total	0.20 u	MG/KG	0.20	1.0
		Antimony, Total	0.27 u	MG/KG	0.27	1.0
		Selenium, Total	0.34 u	MG/KG	0.34	1.0
		Strontium, Total	0.05	MG/KG	0.01	1.0
		Vanadium, Total	0.05 u	MG/KG	0.05	1.0
		Zinc, Total	0.04 u	MG/KG	0.04	1.0
BLANK1	04C0085-MB1	Mercury, Total	0.02 u	MG/KG	0.02	1.0

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 05/20/04

CLIENT: TNUHANFORD F03-018 H2556 LVL LOT #: 0404L223

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-001	B17N52	Silver, Total	4.7	0.06u	5.0	94.0	1.0
		Aluminum, Total	7050	6710	201	167.3*	1.0
		Arsenic, Total	194	6.4	201	93.5	1.0
		Barium, Total	245	52.1	201	96.2	1.0
		Beryllium, Total	5.1	0.39	5.0	94.1	1.0
		Bismuth, Total	469	0.26u	502	93.3	1.0
		Calcium, Total	10400	7940	2510	99.5	1.0
		Cadmium, Total	43.6	40.2	5.0	68.0*	1.0
		Cobalt, Total	51.7	6.1	50.2	90.8	1.0
		Chromium, Total	30.5	12.2	20.1	91.0	1.0
		Copper, Total	34.5	11.8	25.1	90.4	1.0
		Iron, Total	14600	15300	100	-700. *	1.0
		Mercury, Total	0.18	0.02u	0.17	104.1	1.0
		Potassium, Total	4010	1510	2510	99.5	1.0
		Lithium, Total	121	10.1	100	110.1	1.0
		Magnesium, Total	7190	4790	2510	95.4	1.0
		Manganese, Total	415	353	50.2	123.7*	1.0
		Sodium, Total	2930	648	2510	90.7	1.0
		Nickel, Total	57.3	11.6	50.2	91.0	1.0
		Phosphorus, Total	908	476	502	85.9	1.0
		Lead, Total	52.0	5.2	50.2	93.2	1.0
		Antimony, Total	32.1	0.27u	50.2	63.9	1.0
		Selenium, Total	183	0.34u	201	91.2	1.0
		Strontium, Total	119	25.3	100	93.5	1.0
		Vanadium, Total	73.9	30.6	50.2	86.3	1.0
		Zinc, Total	82.7	35.4	50.2	94.2	1.0

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 05/20/04

CLIENT: TNUHANFORD F03-018 H2556 LVL LOT #: 0404L223

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-001REP	B17N52	Silver, Total	0.06u	0.06u	NC	1.0
		Aluminum, Total	6710	6730	0.24	1.0
		Arsenic, Total	6.4	5.0	24.6	1.0
		Barium, Total	52.1	45.1	14.4	1.0
		Beryllium, Total	0.39	0.36	9.7	1.0
		Bismuth, Total	0.26u	0.26u	NC	1.0
		Calcium, Total	7940	8770	9.9	1.0
		Cadmium, Total	40.2	42.0	4.4	1.0
		Cobalt, Total	6.1	6.0	1.7	1.0
		Chromium, Total	12.2	12.3	0.82	1.0
		Copper, Total	11.8	11.0	7.0	1.0
		Iron, Total	15300	15300	0.23	1.0
		Mercury, Total	0.02u	0.02u	NC	1.0
		Potassium, Total	1510	1390	7.7	1.0
		Lithium, Total	10.1	10.8	6.7	1.0
		Magnesium, Total	4790	5110	6.4	1.0
		Manganese, Total	353	351	0.43	1.0
		Sodium, Total	648	644	0.50	1.0
		Nickel, Total	11.6	12.4	6.7	1.0
		Phosphorus, Total	476	485	1.9	1.0
		Lead, Total	5.2	4.4	16.7	1.0
		Antimony, Total	0.27u	0.27u	NC	1.0
		Selenium, Total	0.34u	0.34u	NC	1.0
		Strontium, Total	25.3	26.3	3.9	1.0
		Vanadium, Total	30.6	29.8	2.6	1.0
		Zinc, Total	35.4	36.5	3.1	1.0

Lionville Laboratory, Inc.

INORGANICS LABORATORY CONTROL STANDARDS REPORT 05/20/04

CLIENT: TNUHANFORD F03-018 H2556 LVL LOT #: 0404L223

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	SPIKED AMOUNT	UNITS	%RECOV
LCS1	04L0277-LC1	Silver, LCS	51.1	50.0	MG/KG	102.2
		Aluminum, LCS	506	500	MG/KG	101.3
		Arsenic, LCS	967	1000	MG/KG	96.7
		Barium, LCS	523	500	MG/KG	104.6
		Beryllium, LCS	25.6	25.0	MG/KG	102.4
		Bismuth, LCS	492	500	MG/KG	98.4
		Calcium, LCS	2610	2500	MG/KG	104.4
		Cadmium, LCS	25.6	25.0	MG/KG	102.4
		Cobalt, LCS	258	250	MG/KG	103.2
		Chromium, LCS	51.9	50.0	MG/KG	103.8
		Copper, LCS	127	125	MG/KG	101.4
		Iron, LCS	479	500	MG/KG	95.7
		Potassium, LCS	2490	2500	MG/KG	99.7
		Lithium, LCS	519	500	MG/KG	103.8
		Magnesium, LCS	2530	2500	MG/KG	101.1
		Manganese, LCS	79.7	75.0	MG/KG	106.3
		Sodium, LCS	2310	2500	MG/KG	92.4
		Nickel, LCS	206	200	MG/KG	103.2
		Phosphorus, LCS	457	500	MG/KG	91.3
		Lead, LCS	255	250	MG/KG	102.0
		Antimony, LCS	308	300	MG/KG	102.6
		Selenium, LCS	930	1000	MG/KG	93.0
		Strontium, LCS	507	500	MG/KG	101.4
		Vanadium, LCS	256	250	MG/KG	102.3
		Zinc, LCS	101	100	MG/KG	101.4
LCS1	04C0085-LC1	Mercury, LCS	6.2	6.2	MG/KG	99.5

Date: 23 September 2005
To: Fluor Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 216-Z-9 Trench Characterization Borehole - Soil
Subject: Radiochemistry - Data Package No. H2556

INTRODUCTION

This memo presents the results of data validation on Data Package No. H2556 prepared by Eberline Services (EB). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample	Media	Validation	Analysis
B17N52	3/23/04	Soil	C	See note 1

1 -Gamma spectroscopy, total uranium and alpha spectroscopy.

Data validation was conducted in accordance with the FHI validation statement of work and the Plutonium/Organic-rich Process Condensate/Process Waste Group Operable Unit Representative Sites Sampling and Analysis Plan, DOE/RL-2001, Rev. 0. Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation
Appendix 6. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for radiochemical analysis is 6 months.

All holding times were acceptable.

- **Laboratory (Method) Blanks**

Laboratory Blanks

Blank samples are analyzed to determine if positive results are due to laboratory reagent, sample container, or detector contamination. If blank analysis results indicate the presence of an analyte above the required detection limit (RDL), the following qualifiers are applied: All positive sample results less than five times the highest blank concentration are qualified as estimates and flagged "J"; sample results below the minimum detectable activity (MDA) are qualified as undetected and flagged "U"; sample results above the MDA and greater than five times the highest blank concentration are not qualified.

All laboratory blank results were acceptable although several analytes exceeded the RTQL.

Field Blanks

No field blanks were submitted for analysis.

- **Accuracy**

Accuracy is evaluated by analyzing distilled water or field samples spiked with known amounts of radionuclides. The sample activity as determined by analysis is compared to the known activity to assess accuracy. The acceptable laboratory control sample (LCS) and matrix spike (MS) recovery range is either 65-135% or 70-130%, depending on the analyte. In addition, samples may be spiked with a radiochemical tracer to assist in isolating the radioisotope of interest with the yield of the tracer being used in calculating sample activity. The acceptable range for tracer recovery is 20% to 105%. Spike sample results outside the above ranges result in associated sample results being qualified as estimates, rejected, or not qualified, depending on the activity of the individual sample.

All accuracy results were acceptable.

- **Precision**

Analytical precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. Precision may also be assessed using unspiked duplicate sample analyses. If both sample and replicate activities are greater than five times the contract required detection limit (CRDL) and the RPD is less than +/- 35 percent, the results are acceptable. If either activities are less then five times the CRDL, a control limit of less than or

equal to two times the CRDL is used for soil samples and less than or equal to the CRDL for water samples. If either the original or replicate value is below the CRDL, the applicable control limits are less than or equal to the CRDL for water samples and less than or equal to two times the CRDL for soil samples. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

All duplicate results were acceptable.

Field Duplicate Samples

No field duplicates were submitted for analysis.

- **Detection Levels**

Reported analytical detection levels are compared against the required target quanitation limits (RTQLs) to ensure that laboratory detection levels meet the required criteria. Thriteen analytes exceeded the RTQL. Under the FHI statement of work, no qualification is required. All other reported laboratory detection levels met the analyte specific RTQL.

- **Completeness**

Data package SDG No. H2556 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Thirteen analytes exceeded the RTQL. Under the FHI statement of work, no qualification is required.

REFERENCES

FHI, Contract #20266, *Validation Statement of Work*, Fluor Hanford Incorporated, July 7, 2003.

DOE/RL-2001, Rev. 0, *Plutonium/Organic-rich Process Condensate/Process Waste Group Operable Unit Representative Sites Sampling and Analysis Plan.*

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the FHI statement of work are as follows:

U - Indicates the compound or analyte was analyzed for and not detected above the minimum detectable activity (MDA) in the sample. The value reported is the sample result corrected for sample dilution and moisture content by the laboratory. The data is usable for decision making purposes.

UJ - Indicates the compound or analyte was analyzed for and not detected at concentrations above the minimum detectable activity (MDA) in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate, but is usable for decision making purposes.

J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

Appendix 2

Summary of Data Qualification

RADIOCHEMISTRY DATA QUALIFICATION SUMMARY*

SDG: H2556	REVIEWER: TLI	PROJECT: 216-Z-9	PAGE 1 OF 1
COMMENTS: No qualifiers assigned			

* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

Project: FLUOR-HANFORD			
Laboratory: EB			
Case	SDG: H2556		
Sample Number		B17N52	
Remarks			
Sample Date		3/23/04	
Radiochemistry	RTQL	Result	Q
Gross Alpha		4600	
Gross Beta		1960	
Total Uranium (ug/g)		1.62	
Uranium-233/234(aspec)	1	0	U*
Uranium-235(aspec)	1	1.50	U*
Uranium-238(aspec)	1	1.24	U*
Plutonium-238	1	1.90	U*
Plutonium-239/240	1	29.9	
Americium-241	1	4380	
Potassium-40		18.8	
Cobalt-60	0.05	U	U*
Antimony-125	0.3	U	U*
Cesium-134	0.1	U	U*
Cesium 137	0.1	U	U*
Radium-226	0.1	U	U*
Radium-228	0.2	U	U*
Europium-152	0.1	U	U*
Europium-154	0.1	U	U*
Europium-155	0.1	U	U*
Thorium-228		U	U
Thorium-232		U	U
Uranium-235(gea)		U	U
Uranium-238(gea)		U	U
Americium-241(gea)		4740	

000040

* - RTQL exceeded
Laboratory applied non-detect qualifiers "U" have been included in this table to minimize potential miss-interpretation of results. All other qualifiers shown were applied during validation.

EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H2556

7013-001 B17N52

DATA SHEET

SDG	7013	Client/Case no	Hanford SDG H2556
Contact	Melissa C. Mannion	Contract	No. 630
Lab sample id	R404025-01	Client sample id	B17N52
Dept sample id	7013-001	Location/Matrix	216-Z-9/C3426 - Interval SOLID
Received	04/02/04	Collected/Weight	03/23/04 08:35 39.18 g
% solids	96.2	Custody/SAF No	F03-018-079 F03-018

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALIFIERS	TEST
Gross Alpha	12587-46-1	4600	210	24	10		93A
Gross Beta	12587-47-2	1960	110	69	15		93B
Total Uranium (ug/g)	7440-61-1	1.62	0.18	0.037	1.0		U_T
Uranium 233/234	U-233/234	0	2.5	9.5	1.0	U	U
Uranium 235	15117-96-1	1.50	3.0	11	1.0	U	U
Uranium 238	U-238	1.24	2.5	9.5	1.0	U	U
Plutonium 238	13981-16-3	1.90	1.9	2.6	1.0	U	PU
Plutonium 239/240	PU-239/240	29.9	5.3	1.8	1.0		PU
Americium 241	14596-10-2	4380	370	12	1.0		AM
Potassium 40	13966-00-2	18.8	7.1	5.6			GAM
Cobalt 60	10198-40-0	U		0.53	0.050	U	GAM
Antimony 125	14234-35-6	U		0.96		U	GAM
Cesium 134	13967-70-9	U		0.61		U	GAM
Cesium 137	10045-97-3	U		0.47	0.10	U	GAM
Radium 226	13982-63-3	U		0.82	0.10	U	GAM
Radium 228	15262-20-1	U		2.4	0.20	U	GAM
Europium 152	14683-23-9	U		1.0	0.10	U	GAM
Europium 154	15585-10-1	U		1.0	0.10	U	GAM
Europium 155	14391-16-3	U		1.1	0.10	U	GAM
Thorium 228	14274-82-9	U		1.6		U	GAM
Thorium 232	TH-232	U		2.4		U	GAM
Uranium 235	15117-96-1	U		1.3		U	GAM
Uranium 238	U-238	U		55		U	GAM
Americium 241	14596-10-2	4740	12	4.4			GAM

216-Z-9 Trench Characterization

7/10/05

Lab id	EBRLNE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	05/18/04

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

1.0 GENERAL

Fluor Hanford Inc. (FH) Sample Delivery Group H2556 was composed of one soil sample designated under SAF No. F03-018 with a Project Designation of: 216-Z-9 Trench Characterization Borehole – Soil.

The sample was received as stated on the Chain-of-Custody document. Any discrepancies are noted on the Eberline Services Sample Receipt Checklist.

2.0 ANALYSIS NOTES

2.1 Gross Alpha and Beta Analyses

No problems were encountered during the course of the analyses.

2.2 Isotopic Uranium Analyses

No problems were encountered during the course of the analyses.

2.3 Total Uranium Analyses

No problems were encountered during the course of the analyses.

2.4 Isotopic Plutonium Analyses

No problems were encountered during the course of the analyses.

2.5 Americium-241 Analyses

No problems were encountered during the course of the analyses.

2.6 Gamma Spectroscopy Analyses

No problems were encountered during the course of the analyses.

Case Narrative Certification Statement

"I certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data obtained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."

Melissa C. Mannion
Senior Program Manager

5/20/4
Date

FLUOR Hanford Inc.	CENTRAL PLATEAU CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F03-018-079	Page 1 of 1

Collector Pope/Pfister/Hughes	Company Contact Steve Trent	Telephone No. 373-5869	Project Coordinator TRENT, SJ
Project Designation 216-Z-9 Trench Characterization Borehole - Soil	Sampling Location 216-Z-9/C3426 - Interval 90'-92.5' H2556 (7013)		SAF No. F03-018
Ice Chest No. 12/0301003	Field Logbook No. HNF-N-3361	COA 119152ES10	Method of Shipment Federal Express
Shipped To EBERLINE SERVICES (Formerly TMA)	Offsite Property No. See RSR		Bill of Lading/Air Bill No. See RSR

Price Code 8N | Data Turnaround 45 Days | Air Quality ☐

POSSIBLE SAMPLE HAZARDS/REMARKS

RADIOACTIVE TIE TO: B17NN0

Special Handling and/or Storage

SAMPLERS: Fill VOA vials with Zero head space.

Preservation	Cool 4C	Cool 4C	Cool 4C	None	None	Cool 4C					
Type of Container	aGs*	aG	aG	aG	aG	aG					
No. of Container(s)	3		1	1	1						
Volume	40mL	60mL	120mL	120mL	60mL	60mL					
SAMPLE ANALYSIS	See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions.	See item (4) in Special Instructions.	See item (5) in Special Instructions.	TOC - 415.1; TIC - 415.1M					

(Columns 1–4 and column 6 crossed out: MBB 3/29/04)

Sample No.	Matrix *	Sample Date	Sample Time										
B17N52	SOIL	03/23/04	0835					X					

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
JS Pope [signature]	3-23-04 1230	Site Trailer	3-23-04 1230
Site Trailer	4/1/04 0745	M.H. Buechler [signature]	4/1/04 0745
M.H. Buechler [signature]	4/1/04 0745	Fed EX	
Fed Ex	4/2/04 9:30	[signature]	4/2/04 1:30 P

SPECIAL INSTRUCTIONS

(1) VOA - 8260A (TCL); VOA - 8260A (Add-On) {1-Butanol, Acetonitrile, cis-1,2-Dichloroethylene, Hexane, n-Butylbenzene, trans-1,2-Dichloroethylene}
(2) Semi-VOA - 8270A (TCL); Semi-VOA -- 8270A (Add-On) {1,2,4-Trimethylbenzene, Cyclohexanone, Tributyl phosphate}; TPH-Diesel Range - WTPH-D {Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range}
(3) ICP Metals - 6010A (TAL); ICP Metals - 6010A (Add-on) {Arsenic, Beryllium, Bismuth, Lead, Lithium, Phosphorus, Selenium, Strontium}; Mercury - 7471 - (CV)
(4) IC Anions - 300.0 {Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate}; Ammonia - 350.3; Total Cyanide - 9010; pH (Soil) - 9045; NO2/NO3 - 353.2; Soil Cation Exchange Capacity - 9080; Sulfides - 9030; Chromium Hex - 7196; Oil & Grease - 413.1
(5) Gross Alpha; Gross Beta; Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-on {Antimony-125, Cesium-134}; Americium-241; Isotopic Plutonium; Isotopic Uranium; Total Uranium

Matrix *
S=Soil
SE=Sediment
SO=Solid
SL=Sludge
W=Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

A-6003-618(03/03)

000014

Appendix 5

Data Validation Supporting Documentation

APPENDIX A

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 216-Z-9			DATA PACKAGE: H2556		
VALIDATOR: TLJ		LAB: EKS		DATE: 7/3/05	
			SDG: H258		
ANALYSES PERFORMED					
~~Gross Alpha/Beta~~ ~~Total Uranium~~	Strontium-90 Radium-22	Technetium-99 Tritium	Alpha Spectroscopy	Gamma Spectroscopy	
SAMPLES/MATRIX					
B17N52					
					Soil

1. Completeness ..... ☐ N/A

Technical verification forms present? ..... Yes (No) N/A

Comments: _____

_____

_____

_____

_____

2. Initial Calibration (Levels D, E) ..... ☒ N/A

Instruments/detectors calibrated? ..... Yes No N/A

Initial calibration acceptable? ..... Yes No N/A

Standards NIST traceable? ..... Yes No N/A

Standards Expired? ..... Yes No N/A

Calculation check acceptable? ..... Yes No N/A

Comments: _____

_____

_____

_____

3. Continuing Calibration (Levels D, E) ☒ N/A

Calibration checked within required frequency? ..... Yes No N/A

Calibration check acceptable? ..... Yes No N/A

Calibration check standards traceable? ..... Yes No N/A

Calibration check standards expired? ..... Yes No N/A

Calculation check acceptable? ..... Yes No N/A

Comments: _____

_____

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4. Background Counts (Levels D, E) ..... ☒ N/A

Background Counts checked within required frequency? ..... Yes No N/A

Background Counts acceptable? ..... Yes No N/A

Calculation check acceptable? ..... Yes No N/A

Comments: _____

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5. Blanks (Levels B, C, D, E) ..... ☐ N/A

Method blank analyzed within required frequency? ..... Yes No N/A
Method blank results acceptable? ..... Yes No N/A
Analytes detected in method blank? ..... Yes No N/A
Field blank(s) analyzed? ..... Yes No N/A
Field blank results acceptable? ..... Yes No N/A
Analytes detected in field blank(s)? ..... Yes No N/A
Transcription/Calculation Errors? (Levels D, E) ..... Yes No N/A
Comments: No FB

6. Laboratory Control Samples or Blank Spike Samples (Levels C, D, E) ..... ☐ N/A

LCS /BSS analyzed within required frequency? ..... Yes No N/A
LCS/BSS recoveries acceptable? ..... Yes No N/A
LCS/BSS traceable? (Levels D,E) ..... Yes No N/A
LCS/BSS expired? (Levels D,E) ..... Yes No N/A
LCS/BSS levels correct? (Levels D,E) ..... Yes No N/A
Transcription/Calculation Errors? (Levels D, E) ..... Yes No N/A
Comments:

7. Chemical Carrier Recovery (Levels C, D, E) ..... ☐ N/A

Chemical carrier added? ..... Yes No N/A
Chemical recovery acceptable? ..... Yes No N/A
Chemical carrier traceable? (Levels D, E) ..... Yes No N/A

Chemical carrier expired? (Levels D, E) ..... Yes No N/A

Transcription/Calculation errors? (Levels D, E) ..... Yes No N/A

Comments: _____

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8. Tracer Recovery (Levels C, D, E) ..... ☐ N/A

Tracer added? ..... Yes No N/A

Tracer recovery acceptable? ..... Yes No N/A

Tracer traceable? (Levels D, E) ..... Yes No N/A

Tracer expired? (Levels D, E) ..... Yes No N/A

Transcription/Calculation errors? (Levels D, E) ..... Yes No N/A

Comments: _____

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9. Matrix Spikes (Levels C, D, E) ..... ☒ N/A

Matrix spike analyzed? ..... Yes No N/A

Spike recoveries acceptable? ..... Yes No N/A

Spike source traceable? (Levels D, E) ..... Yes No N/A

Spike source expired? Levels D, E) ..... Yes No N/A

Transcription/Calculation Errors? (Levels D, E) ..... Yes No N/A

Comments: _____

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10. Duplicates (Levels C, D, E) ..... ☐ N/A

Duplicates Analyzed at required frequency? ..... Yes No N/A

RPD Values Acceptable? ..... Yes No N/A

Transcription/Calculation Errors? (Levels D, E) ..... Yes No N/A

Comments: _____

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11. Field QC Samples (Levels C, D E) ..... ☐ N/A

Field duplicate sample(s) analyzed? ..... Yes No N/A

Field duplicate RPD values acceptable? ..... Yes No N/A

Field split sample(s) analyzed? ..... Yes No N/A

Field split RPD values acceptable? ..... Yes No N/A

Performance audit sample(s) analyzed? ..... Yes No N/A

Performance audit sample results acceptable? ..... Yes No N/A

Comments: no field QC

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12. Holding Times (All levels)

Are sample holding times acceptable? ..... Yes No N/A

Comments: _____

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13. Results and Detection Limits (All Levels) ☐ N/A

Results reported for all required sample analyses?	Yes	No	N/A
Results supported in raw data?(Levels D, E)	Yes	No	N/A
Results Acceptable? (Levels D, E)	Yes	No	N/A
Transcription/Calculation errors? (Levels D, E)	Yes	No	N/A
MDA's meet required detection limits?	Yes	No	N/A
Transcription/calculation errors? (Levels D, E)	Yes	No	N/A

Comments: 13 over

Appendix 6

Additional Documentation Requested by Client

EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H2556

7013-003 Method Blank

METHOD BLANK

SDG 7013 Client/Case no Hanford SDG H2556
Contact Melissa C. Mannion Contract No. 630

Lab sample id R404025-03 Client sample id Method Blank
Dept sample id 7013-003 Material/Matrix SOLID
SAF No F03-018

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Gross Alpha	12587-46-1	2.22	13	26	10	U	93A
Gross Beta	12587-47-2	-87.6	51	92	15	U	93B
Total Uranium (ug/g)	7440-61-1	0.012	0.016	0.037	1.0	U	U_T
Uranium 233/234	U-233/234	2.53	2.5	9.7	1.0	U	U
Uranium 235	15117-96-1	1.53	3.1	12	1.0	U	U
Uranium 238	U-238	0	2.5	9.7	1.0	U	U
Plutonium 238	13981-16-3	0.208	0.83	2.0	1.0	U	PU
Plutonium 239/240	PU-239/240	0	0.42	1.6	1.0	U	PU
Americium 241	14596-10-2	4.27	5.7	11	1.0	U	AM
Potassium 40	13966-00-2	U		2.5		U	GAM
Cobalt 60	10198-40-0	U		0.22	0.050	U	GAM
Antimony 125	14234-35-6	U		0.36		U	GAM
Cesium 134	13967-70-9	U		0.26		U	GAM
Cesium 137	10045-97-3	U		0.17	0.10	U	GAM
Radium 226	13982-63-3	U		0.34	0.10	U	GAM
Radium 228	15262-20-1	U		0.82	0.20	U	GAM
Europium 152	14683-23-9	U		0.43	0.10	U	GAM
Europium 154	15585-10-1	U		0.64	0.10	U	GAM
Europium 155	14391-16-3	U		0.30	0.10	U	GAM
Thorium 228	14274-82-9	U		0.22		U	GAM
Thorium 232	TH-232	U		0.82		U	GAM
Uranium 235	15117-96-1	U		0.47		U	GAM
Uranium 238	U-238	U		25		U	GAM
Americium 241	14596-10-2	U		0.42		U	GAM

216-Z-9 Trench Characterization

QC-BLANK #47230

Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 05/18/04

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2556

7013-002

Lab Control Sample

LAB CONTROL SAMPLE

SDG 7013
Contact Melissa C. Mannion

Client/Case no Hanford SDG H2556
Contract No. 630

Lab sample id R404025-02
Dept sample id 7013-002

Client sample id Lab Control Sample
Material/Matrix SOLID
SAF No F03-018

ANALYTE	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ADDED pCi/g	2σ ERR pCi/g	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Gross Alpha	2530	160	34	10		93A	2140	86	118	62-138	70-130
Gross Beta	2380	110	58	15		93B	2260	90	105	74-126	70-130
Total Uranium (ug/g)	196	22	0.37	1.0		U_T	181	7.2	108	76-124	80-120
Uranium 233/234	992	110	47	1.0		U	966	39	103	80-120	80-120
Uranium 235	767	90	12	1.0		U	785	31	98	80-120	80-120
Uranium 238	1020	110	45	1.0		U	1050	42	97	82-118	80-120
Plutonium 238	1310	49	1.9	1.0		PU	1330	53	98	89-111	80-120
Plutonium 239/240	1450	53	1.9	1.0		PU	1450	58	100	89-111	80-120
Americium 241	1040	110	11	1.0		AM	1050	42	99	82-118	80-120
Cobalt 60	55.2	1.8	0.91	0.050		GAM	56.4	2.3	98	77-123	80-120
Cesium 137	52.0	1.4	0.98	0.10		GAM	52.2	2.1	100	76-124	80-120

216-Z-9 Trench Characterization

QC-LCS #47229

Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 05/18/04

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2556

7013-004

B17N52

DUPLICATE

SDG 7013
Contact Melissa C. Mannion
DUPLICATE
Lab sample id R404025-04
Dept sample id 7013-004
% solids 96.2

ORIGINAL
Lab sample id R404025-01
Dept sample id 7013-001
Received 04/02/04
% solids 96.2

Client/Case no Hanford SDG H2556
Contract No. 630
Client sample id B17N52
Location/Matrix 216-Z-9/C3426 - Interval SOLID
Collected/Weight 03/23/04 08:35 39.18 g
Custody/SAF No F03-018-079 F03-018

ANALYTE	DUPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI-FIERS	RPD %	3σ PROT TOT LIMIT
Gross Alpha	4330	210	16	10		93A	4600	210	24		6	44
Gross Beta	1880	100	55	15		93B	1960	110	69		4	34
Total Uranium (ug/g)	1.53	0.17	0.037	1.0		U_T	1.62	0.18	0.037		6	30
Uranium 233/234	1.39	2.8	11	1.0	U	U	0	2.5	9.5	U	-	
Uranium 235	0	3.4	13	1.0	U	U	1.50	3.0	11	U	-	
Uranium 238	1.39	2.8	11	1.0	U	U	1.24	2.5	9.5	U	-	
Plutonium 238	2.20	1.3	1.7	1.0		PU	1.90	1.9	2.6	U	15	169
Plutonium 239/240	28.8	5.3	1.7	1.0		PU	29.9	5.3	1.8		4	40
Americium 241	4590	360	11	1.0		AM	4380	370	12		5	20
Potassium 40	20.8	4.9	3.6			GAM	18.8	7.1	5.6		10	73
Cobalt 60	U		0.48	0.050	U	GAM	U		0.53	U	-	
Antimony 125	U		0.67		U	GAM	U		0.96	U	-	
Cesium 134	U		0.46		U	GAM	U		0.61	U	-	
Cesium 137	U		0.40	0.10	U	GAM	U		0.47	U	-	
Radium 226	U		0.88	0.10	U	GAM	U		0.82	U	-	
Radium 228	U		2.3	0.20	U	GAM	U		2.4	U	-	
Europium 152	U		0.69	0.10	U	GAM	U		1.0	U	-	
Europium 154	U		0.97	0.10	U	GAM	U		1.0	U	-	
Europium 155	U		0.57	0.10	U	GAM	U		1.1	U	-	
Thorium 228	U		0.82		U	GAM	U		1.6	U	-	
Thorium 232	U		2.3		U	GAM	U		2.4	U	-	
Uranium 235	U		0.82		U	GAM	U		1.3	U	-	
Uranium 238	U		43		U	GAM	U		55	U	-	
Americium 241	3760	11	4.1			GAM	4740	12	4.4		23	32

216-Z-9 Trench Characterization

QC-DUP#1 47231

Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-DUP
Version 3.06
Report date 05/18/04

000025 0000013

Date: 23 July 2005
To: Fluor Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 216-Z-9 Trench Characterization Borehole - Soil
Subject: Wet Chemistry - Data Package No. H2556

INTRODUCTION

This memo presents the results of data validation on Data Package No. H2556 prepared by Lionville Laboratory, Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample	Media	Validation	Analysis
B17N52	3/23/04	Soil	C	See note 1

1 - Anions by 300.0, chromium VI by 7196A, cyanide by 9010B, nitrate/nitrite by 353.2, ammonia by 350.3, total organic carbon and total inorganic carbon by 415.1, oil & grease by 9071A, pH by 9045C and sulfide by 9030B.
* - Nitrate, nitrite and phosphate not validated or reported per FHI.

Data validation was conducted in accordance with the FHI validation statement of work and the Plutonium/Organic-rich Process Condensate/Process Waste Group Operable Unit Representative Sites Sampling and Analysis Plan, DOE/RL-2001, Rev. 0. Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation
Appendix 6. Additional Documentation Requested by Client

DATA QUALITY PARAMETERS

- **Holding Times/Sample Preservation**

Analytical holding times are assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be analyzed within 28 days for fluoride, chloride, chromium VI, sulfate, nitrate/nitrite, ammonia, total organic carbon, total inorganic carbon and oil & grease; 14 days for cyanide; 7 days for sulfide; and immediate (24 hours) for pH.

If holding times are exceeded, but not by greater than two times the limit, all

"UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

Due to the holding time being exceeded by less than twice the limit, all sulfide, chloride, fluoride and sulfate results were qualified as estimates and flagged "J".

Due to the holding time being exceeded by greater than twice the limit, all pH results were qualified as estimates and flagged "J".

All other holding times were acceptable.

- **Method Blanks**

Method Blanks

Method blank analyses are performed to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. All blank results must fall below the contract required detection limit (CRQL) to be acceptable.

All method blank results were acceptable.

Field (Equipment) Blank

No equipment blanks were submitted for analysis.

- **Accuracy**

Matrix Spike

Matrix spike (MS) and matrix spike duplicate (MSD) analyses are used to assess the analytical accuracy of the reported data. The matrix spike is used to assess effect of the matrix on the ability to accurately quantify sample concentrations. Recoveries must fall within the range of 70% to 130%. Samples with a spike recovery of less than 30% and a sample result below the IDL are rejected and flagged "UR". Samples with a spike recovery of 30% to 69% and a sample result less than the IDL are qualified "UJ". Samples with a spike recovery of greater than 130% or less than 69% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a spike recovery greater than 130% and a sample result less than the IDL, no qualification is required.

Due to the lack of a matrix spike analysis, all total inorganic carbon results were

qualified as estimates and flagged "J".

All other MS/MSD results were acceptable.

Laboratory Control Sample

The LCS is used to monitor the overall performance of all steps in the analysis. Recoveries must fall within the range of 70% to 130% for LCS analysis. Samples with a recovery of less than 50% are rejected and flagged "UR". Samples with a recovery of 50% to 69% and a sample recovery below the IDL are qualified "UJ". Samples with a recovery of greater than 130% or less than 70% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a recovery greater than 130% and a sample result less than the IDL, no qualification is required.

All LCS results were acceptable.

- **Precision**

Laboratory Duplicate Samples

Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of matrix spike duplicate (MSD) analyses performed on a sample in the analytical batch. Precision may alternatively be assessed using unspiked duplicate analyses performed on a sample in the analytical batch. If both sample and replicate activities (concentrations) are greater than five times the CRDL and the RPD is less than 30%, no qualification is required. If either activity (concentration) is less than five times the CRDL, the RPD control limit is less than or equal to two times the CRDL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

Due to an RPD outside QC limits (36%), all total inorganic carbon results were qualified as estimates and flagged "J".

All other laboratory duplicate results were acceptable.

Field Duplicate

No field duplicates were submitted for analysis.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the required target quantitation limits (RTQLs) to ensure that laboratory detection levels meet the

required criteria. All results met the RTQL.

- **Completeness**

Data package No. H2556 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to the holding time being exceeded by less than twice the limit, all sulfide, chloride, fluoride and sulfate results were qualified as estimates and flagged "J". Due to the holding time being exceeded by greater than twice the limit, all pH results were qualified as estimates and flagged "J". Due to an RPD outside QC limits (36%), all total inorganic carbon results were qualified as estimates and flagged "J". Due to the lack of a matrix spike analysis, all total inorganic carbon results were qualified as estimates and flagged "J". Data flagged "J" is an estimate, but under the FHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

FHI, Contract #20266, *Validation Statement of Work*, Fluor Hanford Incorporated, July 7, 2003.

DOE/RL-2001, Rev. 0, *Plutonium/Organic-rich Process Condensate/Process Waste Group Operable Unit Representative Sites Sampling and Analysis Plan.*

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with FHI validation SOW are as follows:

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.

BJ - Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

WET CHEMISTRY DATA QUALIFICATION SUMMARY*

SDG: H2556	REVIEWER: TLI	PROJECT: 216-Z-9	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Total inorganic carbon	J	All	No matrix spike analysis
Total inorganic carbon	J	All	RPD
Sulfide Chloride Fluoride Sulfate pH	J	All	Holding time

* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

Project: FLUOR-HANFORD			
Laboratory: LLI			
Case	SDG: H2556		
Sample Number		B17N52	
Remarks			
Sample Date		3/23/04	
Wet Chemistry	RQL	Result	Q
Chloride	2	27.7	J
Fluoride	5	7.8	J
Cyanide		0.48	U
Chromium VI		0.21	U
Sulfate	5	8.1	J
Nitrate/Nitrite	0.75	384	
Ammonia	0.5	5.8	
Total Organic Carbon	25	143	
Oil & Grease		1620	
pH*		8.4	J
Sulfide		20.6	UJ
Total Inorganic Carbon	25	1980	J
* - Units are pH units			

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Laboratory applied non-detect qualifiers "U" have been included in this table to minimize miss-interpretation of results. All other qualifiers shown were applied during validation.

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 06/03/04

CLIENT: TNUHANFORD F03-018 H2556 LVL LOT #: 0404L223
WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B17N52	% Solids	95.7		%	0.01	1.0
		Chloride by IC	27.7	J	MG/KG	1.3	1.0
		Cation Exchange Capacit	2.8		MEQ/100g	1.4	6.0
		Fluoride by IC	7.8	J	MG/KG	1.3	1.0
		~~Nitrite by IC~~	~~2.96~~		~~MG/KG~~	~~1.31~~	~~1.0~~
		~~Nitrate by IC~~	~~6550~~		~~MG/KG~~	~~65.3~~	~~50.0~~
		Cyanide, Total	0.48	u	MG/KG	0.48	1.0
		~~Phosphate by IC~~	~~1.2~~	~~u~~	~~MG/KG~~	~~1.2~~	~~1.0~~
		Chromium VI	0.21	u	MG/KG	0.21	1.0
		Sulfate by IC	8.1	J	MG/KG	1.3	1.0
		Nitrate Nitrite	384		MG/KG	9.5	50.0
		Ammonia, as N	5.8		MG/KG	5.7	1.0
		Total Organic Carbon	143		MG/KG	38.2	1.0
		Oil & Grease Gravimetri	1620		MG/KG	696	1.0
		pH	8.4	J	SOIL PH	0.01	1.0
		Sulfide	20.6	uJ	MG/KG	20.6	1.0
		Total Inorganic Carbon	1980	J	MG/KG	24.5	1.0

7/10/05

7/10/05

7/10/05

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Analytical Report

Client: TNU-HANFORD F03-018 H2556
LVL#: 0404L223

W.O.#: 11343-606-001-9999-00
Date Received: 04-02-04

INORGANIC NARRATIVE

1. This narrative covers the analyses of 1 soil sample.

2. The sample was prepared and analyzed in accordance with the methods indicated on the attached glossary.

3. Sample holding times as required by the method and/or contract were met with the exception of Sulfide.

4. The results presented in this report are derived from samples that met LvLI's sample acceptance policy.

5. The method blanks were within the method criteria.

6. The Laboratory Control Samples (LCS) were within the laboratory control limits. The duplicate LCS for Ammonia and Oil and Grease were within the 20% Relative Percent Difference (RPD) control limit.

7. The matrix spike recoveries for Chloride, Fluoride, Nitrite Nitrate, Total Cyanide, Phosphate, Chromium VI, Sulfate, Nitrate, Nitrite, Ammonia, Total Organic Carbon (TOC), Oil and Grease and Sulfide were within the 75-125% control limits.

8. The replicate analyses for Percent Solids, Chloride, Fluoride, Nitrite, Nitrate, Total Cyanide, Phosphate, Chromium VI, Sulfate, Nitrate Nitrite, Ammonia, TOC, Oil and Grease, pH, Sulfide and Cation Exchange Capacity (CEC) were within the 20% Relative Percent Difference (RPD) control limit. Total Inorganic Carbon (TIC) was outside the RPD control limit, which may be attributed to sample inhomogeneity.

9. Results for solid samples are reported on a dry weight basis with the exception of TOC samples that are dried prior to analysis.

10. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard copy package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Iain Daniels
Laboratory Manager
Lionville Laboratory Incorporated

06-03-04
Date

njp\i04-223

FLUOR Hanford Inc.	CENTRAL PLATEAU CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F03-018-079	Page 1 of 1

Collector: Pope/Pfister/Hughes	Company Contact: Steve Trent; Telephone No.: 373-5869	Project Coordinator: TRENT, SJ	Price Code 8N; Data Turnaround 45 Days
Project Designation: 216-Z-9 Trench Characterization Borehole - Soil	Sampling Location: 216-Z-9/C3426 - Interval 90'-92.5'	SAF No.: F03-018	Air Quality ☐
Ice Chest No.	Field Logbook No.: HNF-N-3361; COA: 119152ES10	Method of Shipment: Federal Express	
Shipped To: ~~EBERLINE SERVICES (Formerly TMA)~~ MAB 3/29/04 RECRA	Offsite Property No.: See RSR	Bill of Lading/Air Bill No.: See RSR	

POSSIBLE SAMPLE HAZARDS/REMARKS

RADIOACTIVE TIE TO:) B17NN0

Special Handling and/or Storage

SAMPLERS: Fill VOA vials with Zero head space.

000015

Preservation	Cool 4C	Cool 4C	Cool 4C	Cool 4C (~~None~~ MAB 3/30/04)	None	Cool 4C
Type of Container	aGs*	aG	aG	aG	aG	aG
No. of Container(s)	3	1	1	1	1	1
Volume	40mL	60mL	120mL	120mL	60mL	60mL
SAMPLE ANALYSIS	See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions.	See item (4) in Special Instructions.	~~See item (5) in Special Instructions.~~ MAB 3/30/04	TOC - 415.1; TIC - 415.1M

Sample No.	Matrix *	Sample Date	Sample Time						
B17N52	SOIL	03/23/04	0835	X	X	X	X		X

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
J. POPE [signature]	3/23/04 1230	Sample fridge trailer	3/23/04 1230
Sample Fridge Trailer	4/1/04 0745	Greg Thomas [signature]	4/1/04 0745
Greg Thomas [signature]	4/1/04 0745	FED EX	
Fed Ex	4-2-04 / 0945	D. Smith	4-2-04 / 0945

SPECIAL INSTRUCTIONS

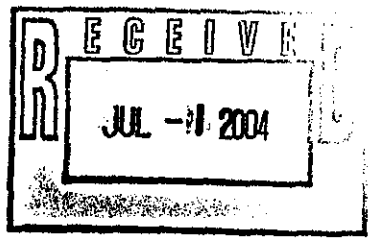
(1) VOA - 8260A (TCL); VOA - 8260A (Add-On) {1-Butanol, Acetonitrile, cis-1,2-Dichloroethylene, Hexane, n-Butylbenzene, trans-1,2-Dichloroethylene}
(2) Semi-VOA - 8270A (TCL); Semi-VOA – 8270A (Add-On) {1,2,4-Trimethylbenzene, Cyclohexanone, Tributyl phosphate}; TPH-Diesel Range - WTPH-D {Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range}
(3) ICP Metals - 6010A (TAL); ICP Metals - 6010A (Add-on) {Arsenic, Beryllium, Bismuth, Lead, Lithium, Phosphorus, Selenium, Strontium}; Mercury - 7471 - (CV)
(4) IC Anions - 300.0 {Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate}; Ammonia - 350.3; Total Cyanide - 9010; pH (Soil) - 9045; NO2/NO3 - 353.2; Soil Cation Exchange Capacity - 9080; Sulfides - 9030; Chromium Hex - 7196; Oil & Grease - 413.1
(5) Gross Alpha; Gross Beta; Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-on {Antimony-125, Cesium-134}; Americium-241; Isotopic Plutonium; Isotopic Uranium; Total Uranium

Matrix *: S=Soil, SE=Sediment, SO=Solid, SL=Sludge, W=Water, O=Oil, A=Air, DS=Drum Solids, DL=Drum Liquids, T=Tissue, WI=Wipe, L=Liquid, V=Vegetation, X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

A-6003-618(03/03)

000015



Lionville Laboratory, Inc.
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD F03-018 H2556

DATE RECEIVED: 04/02/04 LVL LOT # :0404L223

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B17N52						
% SOLIDS	001	S	04L%SA65	03/23/04	04/06/04	04/06/04
% SOLIDS	001 REP	S	04L%SA65	03/23/04	04/06/04	04/06/04
CHLORIDE BY IC	001	S	04LAC022	03/23/04	04/21/04	04/21/04
CHLORIDE BY IC	001 REP	S	04LAC022	03/23/04	04/21/04	04/21/04
CHLORIDE BY IC	001 MS	S	04LAC022	03/23/04	04/21/04	04/21/04
CATION EXCHANGE CAPA	001	S	04LCE001	03/23/04	06/01/04	06/03/04
CATION EXCHANGE CAPA	001 REP	S	04LCE001	03/23/04	06/01/04	06/03/04
FLUORIDE BY IC	001	S	04LAC022	03/23/04	04/21/04	04/21/04
FLUORIDE BY IC	001 REP	S	04LAC022	03/23/04	04/21/04	04/21/04
FLUORIDE BY IC	001 MS	S	04LAC022	03/23/04	04/21/04	04/21/04
NITRITE BY IC	001	S	04LAC022	03/23/04	04/21/04	04/21/04
NITRITE BY IC	001 REP	S	04LAC022	03/23/04	04/21/04	04/21/04
NITRITE BY IC	001 MS	S	04LAC022	03/23/04	04/21/04	04/21/04
NITRATE BY IC	001	S	04LAC022	03/23/04	04/21/04	04/21/04
NITRATE BY IC	001 REP	S	04LAC022	03/23/04	04/21/04	04/21/04
NITRATE BY IC	001 MS	S	04LAC022	03/23/04	04/21/04	04/21/04
TOTAL CYANIDE	001	S	04LCB27	03/23/04	04/06/04	04/06/04
TOTAL CYANIDE	001 REP	S	04LCB27	03/23/04	04/06/04	04/06/04
TOTAL CYANIDE	001 MS	S	04LCB27	03/23/04	04/06/04	04/06/04
PHOSPHATE BY IC	001	S	04LAC022	03/23/04	04/21/04	04/21/04
PHOSPHATE BY IC	001 REP	S	04LAC022	03/23/04	04/21/04	04/21/04
PHOSPHATE BY IC	001 MS	S	04LAC022	03/23/04	04/21/04	04/21/04
CHROMIUM VI	001	S	04LVI012	03/23/04	04/12/04	04/12/04
CHROMIUM VI	001 REP	S	04LVI012	03/23/04	04/12/04	04/12/04
CHROMIUM VI	001 MS	S	04LVI012	03/23/04	04/12/04	04/12/04
CHROMIUM VI	001 MSD	S	04LVI012	03/23/04	04/12/04	04/12/04
SULFATE BY IC	001	S	04LAC022	03/23/04	04/21/04	04/21/04
SULFATE BY IC	001 REP	S	04LAC022	03/23/04	04/21/04	04/21/04
SULFATE BY IC	001 MS	S	04LAC022	03/23/04	04/21/04	04/21/04
NITRATE NITRITE	001	S	04LN3022	03/23/04	04/20/04	04/20/04
NITRATE NITRITE	001 REP	S	04LN3022	03/23/04	04/20/04	04/20/04
NITRATE NITRITE	001 MS	S	04LN3022	03/23/04	04/20/04	04/20/04
AMMONIA	001	S	04LAMA12	03/23/04	04/08/04	04/08/04
AMMONIA	001 REP	S	04LAMA12	03/23/04	04/08/04	04/08/04
AMMONIA	001 MS	S	04LAMA12	03/23/04	04/08/04	04/08/04

Lionville Laboratory, Inc.
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD F03-018 H2556

DATE RECEIVED: 04/02/04 LVL LOT # :0404L223

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
TOTAL ORGANIC CARBON	001	S	04LTZ006	03/23/04	04/15/04	04/15/04
TOTAL ORGANIC CARBON	001 REP	S	04LTZ006	03/23/04	04/15/04	04/15/04
TOTAL ORGANIC CARBON	001 MS	S	04LTZ006	03/23/04	04/15/04	04/15/04
OIL & GREASE BY GRAV	001	S	04LOG009	03/23/04	04/17/04	04/19/04
OIL AND GREASE BY GR	001 REP	S	04LOG009	03/23/04	04/17/04	04/19/04
OIL AND GREASE BY GR	001 MS	S	04LOG009	03/23/04	04/17/04	04/19/04
PH	001	S	04LPH031	03/23/04	04/05/04	04/05/04
PH	001 REP	S	04LPH031	03/23/04	04/05/04	04/05/04
SULFIDE	001	S	04LSD020	03/23/04	04/05/04	04/06/04
SULFIDE	001 REP	S	04LSD020	03/23/04	04/05/04	04/06/04
SULFIDE	001 MS	S	04LSD020	03/23/04	04/05/04	04/06/04
TOTAL INORGANIC CARB	001	S	04LTZA06	03/23/04	04/15/04	04/15/04
TOTAL INORGANIC CARB	001 REP	S	04LTZA06	03/23/04	04/15/04	04/15/04

LAB QC:

CHLORIDE BY IC	MB1	S	04LAC022	N/A	04/21/04	04/21/04
CHLORIDE BY IC	MB1 BS	S	04LAC022	N/A	04/21/04	04/21/04
CATION EXCHANGE CAPA	MB1	S	04LCE001	N/A	06/01/04	06/03/04
FLUORIDE BY IC	MB1	S	04LAC022	N/A	04/21/04	04/21/04
FLUORIDE BY IC	MB1 BS	S	04LAC022	N/A	04/21/04	04/21/04
NITRITE BY IC	MB1	S	04LAC022	N/A	04/21/04	04/21/04
NITRITE BY IC	MB1 BS	S	04LAC022	N/A	04/21/04	04/21/04
NITRATE BY IC	MB1	S	04LAC022	N/A	04/21/04	04/21/04
NITRATE BY IC	MB1 BS	S	04LAC022	N/A	04/21/04	04/21/04
TOTAL CYANIDE	LCS L	S	04LCB27	N/A	04/06/04	04/06/04
TOTAL CYANIDE	LCS L	S	04LCB27	N/A	04/06/04	04/06/04
TOTAL CYANIDE	MB1	S	04LCB27	N/A	04/06/04	04/06/04
PHOSPHATE BY IC	MB1	S	04LAC022	N/A	04/21/04	04/21/04
PHOSPHATE BY IC	MB1 BS	S	04LAC022	N/A	04/21/04	04/21/04
CHROMIUM VI	MB1	S	04LVI012	N/A	04/12/04	04/12/04
CHROMIUM VI	MB1 BS	S	04LVI012	N/A	04/12/04	04/12/04
CHROMIUM VI	MB1 BSD	S	04LVI012	N/A	04/12/04	04/12/04
SULFATE BY IC	MB1	S	04LAC022	N/A	04/21/04	04/21/04
SULFATE BY IC	MB1 BS	S	04LAC022	N/A	04/21/04	04/21/04
NITRATE NITRITE	MB1	S	04LN3022	N/A	04/20/04	04/20/04
NITRATE NITRITE	MB1 BS	S	04LN3022	N/A	04/20/04	04/20/04
AMMONIA	MB1	W	04LAMA12	N/A	04/08/04	04/08/04

Lionville Laboratory, Inc.
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD F03-018 H2556

DATE RECEIVED: 04/02/04 LVL LOT # :0404L223

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
AMMONIA	MB1 BS	W	04LAMA12	N/A	04/08/04	04/08/04
AMMONIA	MB1 BSD	W	04LAMA12	N/A	04/08/04	04/08/04
TOTAL ORGANIC CARBON	MB1	W	04LTZ006	N/A	04/15/04	04/15/04
TOTAL ORGANIC CARBON	MB1 BS	W	04LTZ006	N/A	04/15/04	04/15/04
OIL & GREASE BY GRAV	MB1	S	04LOG009	N/A	04/17/04	04/19/04
OIL AND GREASE BY GR	MB1 BS	S	04LOG009	N/A	04/17/04	04/19/04
OIL AND GREASE BY GR	MB1 BSD	S	04LOG009	N/A	04/17/04	04/19/04
SULFIDE	MB1	S	04LSD020	N/A	04/05/04	04/06/04
SULFIDE	MB1 BS	S	04LSD020	N/A	04/05/04	04/06/04
TOTAL INORGANIC CARB	MB1	W	04LTZA06	N/A	04/15/04	04/15/04
TOTAL INORGANIC CARB	MB1 BS	W	04LTZA06	N/A	04/15/04	04/15/04

Appendix 5

Data Validation Supporting Documentation

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 216-Z-9			DATA PACKAGE: H2556		
VALIDATOR: TLT		LAB: LLI		DATE: 7/2/05	
			SDG: H2556		
ANALYSES PERFORMED					
Anions/IC	TOC	TIC	TOX	TPH-418.1	Oil and Grease	Alkalinity
Ammonia	BOD/COD		Chloride	Chromium-VI	pH	NO_3/NO_2
Sulfate	TDS		TKN	Phosphate	Sulfid	
SAMPLES/MATRIX						
B17N52						
						Soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? ..... Yes (No) N/A

Comments: _____

_____

_____

2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations performed on all instruments? ..... Yes No (N/A)

Initial calibrations acceptable? ..... Yes No (N/A)

ICV and CCV checks performed on all instruments? ..... Yes No (N/A)

ICV and CCV checks acceptable? ..... Yes No (N/A)

Standards traceable? ..... Yes No (N/A)

Standards expired? ..... Yes No (N/A)

Calculation check acceptable? ..... Yes No (N/A)

Comments: _____

_____

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

3. BLANKS (Levels B, C, D, and E)

ICB and CCB checks performed for all applicable analyses? (Levels D, E) ..... Yes No N/A
ICB and CCB results acceptable? (Levels D, E) ..... Yes No N/A
Laboratory blanks analyzed? ..... Yes No N/A
Laboratory blank results acceptable? ..... Yes No N/A
Field blanks analyzed? (Levels C, D, E) ..... Yes No N/A
Field blank results acceptable? (Levels C, D, E) ..... Yes No N/A
Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments: No FB

4. ACCURACY (Levels C, D, and E)

Spike samples analyzed? ..... Yes No N/A
Spike recoveries acceptable? ..... Yes No N/A
Sike standards NIST traceable? (Levels D, E) ..... Yes No N/A
Spike standards expired? (Levels D, E) ..... Yes No N/A
LCS/BSS samples analyzed? ..... Yes No N/A
LCS/BSS results acceptable? ..... Yes No N/A
Standards traceable? (Levels D, E) ..... Yes No N/A
Standards expired? (Levels D, E) ..... Yes No N/A
Transcription/calculation errors? (Levels D, E) ..... Yes No N/A
Performance audit sample(s) analyzed? ..... Yes No N/A
Performance audit sample results acceptable? ..... Yes No N/A

Comments: - no TIC MS - J all

hc pf

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

5. PRECISION (Levels C, D, and E)

Duplicate RPD values acceptable? ..... Yes (No) N/A
Duplicate results acceptable? ..... Yes (No) N/A
MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No (N/A)
MS/MSD standards expired? (Levels D, E) ..... Yes No (N/A)
Field duplicate RPD values acceptable? ..... Yes No (N/A)
Field split RPD values acceptable? ..... Yes No (N/A)
Transcription/calculation errors? (Levels D, E) ..... Yes No (N/A)
Comments: TIC - 3620 J all

6. HOLDING TIMES (all levels)

Samples properly preserved? ..... (Yes) No N/A
Sample holding times acceptable? ..... Yes (No) N/A
Comments: Chloride - 29
Fluoride - 29
Sulfate - 29
Sulfide - 14
} J all

pH - 72x J all

GENERAL CHEMISTRY ANALYSIS DATA VALIDATION CHECKLIST

7. RESULT QUANTITATION AND DETECTION LIMITS (all levels)

Results reported for all requested analyses? ..... (Yes) No N/A

Results supported in the raw data? (Levels D, E) ..... Yes No (N/A)

Samples properly prepared? (Levels D, E) ..... Yes No (N/A)

Detection limits meet RDL? ..... (Yes) No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No (N/A)

Comments: _____

Appendix 6

Additional Documentation Requested by Client

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 06/03/04

CLIENT: TNUHANFORD F03-018 H2556 LVL LOT #: 0404L223
WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANK10	04LAC022-MB1	Chloride by IC	1.2	u	MG/KG	1.2	1.0
		Fluoride by IC	1.2	u	MG/KG	1.2	1.0
		Nitrite by IC	1.25	u	MG/KG	1.25	1.0
		Nitrate by IC	1.25	u	MG/KG	1.25	1.0
		Phosphate by IC	1.2	u	MG/KG	1.2	1.0
		Sulfate by IC	1.2	u	MG/KG	1.2	1.0
BLANK10	04LCE001-MB1	Cation Exchange Capacit	1.3	u	MEQ/100g	1.3	6.0
BLANK1	04LCB27-MB1	Cyanide, Total	0.50	u	MG/KG	0.50	1.0
BLANK10	04LVI012-MB1	Chromium VI	0.20	u	MG/KG	0.20	1.0
BLANK10	04LN3022-MB1	Nitrate Nitrite	0.20	u	MG/KG	0.20	1.0
BLANK10	04LAMA12-MB1	Ammonia, as N	5.0	u	MG/KG	5.0	1.0
BLANK10	04LTZ006-MB1	Total Organic Carbon	4.7	u	MG/KG	4.7	1.0
BLANK10	04LOG009-MB1	Oil & Grease Gravimetri	667	u	MG/KG	667	1.0
BLANK10	04LSD020-MB1	Sulfide	40.0	u	MG/KG	40.0	1.0
BLANK10	04LTZA06-MB1	Total Inorganic Carbon	4.7	u	MG/KG	4.7	1.0

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 06/03/04

CLIENT: TNUHANFORD F03-018 H2556 LVL LOT #: 0404L223
WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-001	B17N52	Chloride by IC	81.9	27.7	52.0	104.4	2.0
		Fluoride by IC	35.9	7.8	26.0	108.1	1.0
		Nitrite by IC	29.6	2.06	26.0	105.8	1.0
		Nitrate by IC	4380	1550	2610	108.2	100
		Cyanide, Total	5.19	0.48u	5.09	102.0	1.0
		Phosphate by IC	27.7	1.3 u	26.0	106.7	1.0
		Soluble Chromium VI	3.9	0.21u	4.2	89.8	1.0
		Insoluble Chromium VI	1290	0.21u	1270	101.2	100
		Sulfate by IC	36.6	8.1	26.0	109.7	1.0
		Nitrate Nitrite	923	384	492	109.6	100
		Ammonia, as N	228	5.8	223	99.7	1.0
		Total Organic Carbon	3080	143	2880	102.0	1.0
		Oil & Grease Gravimetr	10400	1620	8900	99.2	1.0
		Sulfide	156	6.2	188	80.0	1.0
BLANK10	04LAC022-MB1	Chloride by IC	22.9	1.2 u	25.0	91.5	1.0
		Fluoride by IC	23.4	1.2 u	25.0	93.8	1.0
		Nitrite by IC	23.3	1.25u	25.0	93.4	1.0
		Nitrate by IC	24.0	1.25u	25.0	95.9	1.0
		Phosphate by IC	22.9	1.2 u	25.0	91.6	1.0
		Sulfate by IC	23.2	1.2 u	25.0	92.8	1.0
BLANK10	04LVI012-MB1	Soluble Chromium VI	4.0	0.20u	4.0	100.3	1.0
		Insoluble Chromium VI	1230	0.20u	1180	104.6	100
BLANK10	04LN3022-MB1	Nitrate Nitrite	5.0	0.20u	5.0	99.4	1.0
BLANK10	04LAMA12-MB1	Ammonia, as N	196	5.0 u	200	97.8	1.0
		Ammonia, as N MSD	182	5.0 u	200	91.2	1.0
BLANK10	04LTZ006-MB1	Total Organic Carbon	403	4.7 u	400	100.7	1.0
BLANK10	04LOG009-MB1	Oil & Grease Gravimetr	8070	667 u	8520	94.7	1.0
		Oil & Grease - Grav M	8040	667 u	8520	94.4	1.0
BLANK10	04LSD020-MB1	Sulfide	317	40.0 u	361	87.8	1.0
BLANK10	04LTZA06-MB1	Total Inorganic Carbon	403	4.7 u	400	100.7	1.0

Lionville Laboratory, Inc.

INORGANICS DUPLICATE SPIKE REPORT 06/03/04

CLIENT: TNUHANFORD F03-018 H2556 LVL LOT #: 0404L223
WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKE#1 %RECOV	SPIKE#2 %RECOV	%DIFF
BLANK10	04LAMA12-MB1	Ammonia, as N	97.8	91.2	6.9
BLANK10	04LOG009-MB1	Oil & Grease - Grav	94.7	94.4	0.3

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 06/03/04

CLIENT: TNUHANFORD F03-018 H2556 LVL LOT #: 0404L223
WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	RPD	DILUTION FACTOR(REP)
-001REP	B17N52	% Solids	95.7	96.1	0.37	1.0
		Chloride by IC	27.7	28.4	2.8	1.0
		Cation Exchange Capacit	2.8	2.9	4.1	1.0
		Fluoride by IC	7.8	8.2	4.4	1.0
		Nitrite by IC	2.06	2.05	0.49	1.0
		Nitrate by IC	1550	1550	0.005	50.0
		Cyanide, Total	0.48u	0.48u	NC	1.0
		Phosphate by IC	1.3 u	1.3 u	NC	1.0
		Chromium VI	0.21u	0.40	NC	1.0
		Sulfate by IC	8.1	8.1	0.00	1.0
		Nitrate Nitrite	384	400	4.3	50.0
		Ammonia, as N	5.8	5.1 u	NC	1.0
		Total Organic Carbon	143	159	11.1	1.0
		Oil & Grease Gravimetri	1620	1410	13.8	1.0
		pH	8.4	8.4	0.1	1.0
		Sulfide	20.6 u	20.2 u	NC	1.0
		Total Inorganic Carbon	1980	2860	36.2	1.0

Lionville Laboratory, Inc.

INORGANICS LABORATORY CONTROL STANDARDS REPORT 06/03/04

CLIENT: TNUHANFORD F03-018 H2556 LVL LOT #: 0404L223
WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	SPIKED AMOUNT	UNITS	%RECOV
LCSS1	04LCB27-LCS1	Cyanide, Total LCS	2.11	2.0	MG/KG	105.3
LCSS2	04LCB27-LCS2	Cyanide, Total LCS	10.3	10.0	MG/KG	103.3

Date: 23 September 2005
To: Fluor Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 216-Z-9 Trench Characterization Borehole - Soil
Subject: Volatiles - Data Package No. H2556

INTRODUCTION

This memo presents the results of data validation on Data Package No. H2556 prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample	Media	Validation	Analysis
B17N52	3/23/04	Soil	C	Volatile by 8260B

Data validation was conducted in accordance with the FHI validation statement of work and the Plutonium/Organic-rich Process Condensate/Process Waste Group Operable Unit Representative Sites Sampling and Analysis Plan, DOE/RL-2001, Rev. 0. Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation

DATA QUALITY OBJECTIVES

- **Holding Times/Sample Preservation**

Analytical holding times were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be analyzed within 14 days of the date of sample collection.

If holding times are exceeded, but not by greater than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

All holding times were acceptable.

- **Blanks**

Method blank analyses are conducted to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples of a given matrix. No contaminants should be present in the method blank. Analytical results for analytes present in any sample at less than five times the concentration of that analyte found in the associated blank are qualified as non-detects and flagged "U". Common laboratory contaminants present in samples at less than ten times the concentration of that analyte found in the associated blank are qualified as non-detects. If a sample result is less than the project quantitation limit (MDL) and is less than five times (or less than ten times for laboratory contaminants) the highest associated blank result, the sample result value is raised to the MDL, qualified as undetected and flagged "U".

All method blank results were acceptable.

Field Blanks

No field blanks were submitted for analysis.

- **Accuracy**

Matrix Spike/Matrix Spike Duplicate & Blank Spike

Matrix spike/matrix spike duplicate and blank spike analyses are used to assess the analytical accuracy of the reported data. The matrix spike/matrix spike duplicate are used to assess the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike/matrix spike duplicate analyses are performed in duplicate using the target compounds for which percent recoveries must be within 70-130%. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Undetected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

All accuracy and blank spike results were acceptable.

Surrogate Recovery

The analysis of surrogate compounds provides a measure of system performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the laboratory program. When a surrogate compound recovery is out of the control window, all positively identified target compounds associated with the unacceptable surrogate recoveries are qualified as estimates and flagged "J". Undetected compounds with surrogate recoveries less than the lower control limit are qualified as having an estimated detection limit and flagged "UJ". Samples with surrogate recoveries less than ten percent are qualified as estimates and flagged "J" for detects, and rejected and flagged "UR" for nondetects. Undetected compounds with surrogate recoveries greater than the upper control limit require no qualification. Surrogates are not required for formaldehyde analysis.

All surrogate recovery results were acceptable.

- **Precision**

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike/matrix spike duplicate results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. Sample results must be within RPD limits of +/- 30%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

All MS/MSD RPD results were acceptable.

Field Duplicate Samples

No field duplicates were submitted for analysis.

- **Detection Limits**

Reported analytical detection levels are compared against the required target quantitation limits (RTQLs) to ensure that laboratory detection levels meet the required criteria. All analytes met the RTQL.

- **Completeness**

Data package No. H2556 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

None found.

REFERENCES

FHI, Contract #20266, *Validation Statement of Work*, Fluor Hanford Incorporated, July 7, 2003.

DOE/RL-2001, Rev. 0, *Plutonium/Organic-rich Process Condensate/Process Waste Group Operable Unit Representative Sites Sampling and Analysis Plan.*

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validator in compliance with the BHI validation SOW are as follows:

U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for dilution and moisture content by the laboratory.

UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

VOLATILE ORGANIC DATA QUALIFICATION SUMMARY*

SDG: H2556	REVIEWER: TLI	PROJECT: 216-Z-9	PAGE 1 OF 1
COMMENTS: No qualifiers assigned			

* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

VOLATILE ORGANIC ANALYSIS, SOIL MATRIX, (UG/KG)

Project: FLUOR-HANFORD			
Laboratory: LLI			
Case:	SDG: H2556		
Sample Number		B17N52	
Sample Date		3/23/04	
VOA	RDL	Result	Q
Chloromethane		10	U
Bromomethane		10	U
Vinyl Chloride		10	U
Chloroethane		10	U
Methylene Chloride	5	12	
Acetone	20	9	
Carbon Disulfide		5	U
1,1-Dichloroethene		5	U
1,1-Dichloroethane	10	5	U
Trans-1,2-dichloroethene		5	U
Cis-1,2-dichloroethene		5	U
1,2-Dichloroethene (total)		5	U
Chloroform	5	5	U
1,2-Dichloroethane	5	5	U
2-Butanone	10	10	U
1,1,1-Trichloroethane	5	5	U
Carbon Tetrachloride	5	5	U
Bromodichloromethane		5	U
1,2-Dichloropropane		5	U
cis-1,3-Dichloropropene		5	U
Trichloroethene		5	U
Dibromochloromethane		5	U
1,1,2-Trichloroethane		5	U
Benzene	5	5	U
trans-1,3-Dichloropropene		5	U
Bromoform		5	U
4-Methyl-2-pentanone		10	U
2-Hexanone	10	10	U
Tetrachloroethene		5	U
1,1,2,2-Tetrachloroethane		5	U
Toluene	5	5	U
Chlorobenzene	5	5	U
Ethylbenzene	5	5	U
Styrene		5	U
Xylenes (total)	5	5	U
Acetonitrile		10	U
n-Butanol		76	
n-Butylbenzene		5	U
Hexane		2	

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize mis-interpretation of results. All other qualifiers shown were applied during validation.

Lionville Laboratory, Inc.
Volatiles By GC/MS, Special List

RFW Batch Number: 0404L223 Client: TNUHANFORD F03-018 H2556 Work Order: 11343606001 Page: 1a Report Date: 05/10/04 10:47

	Cust ID:	B17N52	B17N52	B17N52	VBLKED	VBLKED BS
Sample Information	RFW#:	001	001 MS	001 MSD	04LVG096-MB1	04LVG096-MB1
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	0.980	1.09	1.00	1.00	1.00
	Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Surrogate Recovery	1,2-Dichloroethane-d4	115 %	110 %	120 %	104 %	112 %
	Toluene-d8	96 %	94 %	100 %	90 %	91 %
	Bromofluorobenzene	100 %	99 %	106 %	93 %	97 %
Chloromethane		10 U	11 U	10 U	10 U	10 U
Bromomethane		10 U	11 U	10 U	10 U	10 U
Vinyl Chloride		10 U	11 U	10 U	10 U	10 U
Chloroethane		10 U	11 U	10 U	10 U	10 U
Methylene Chloride		12	15	19	5 U	5 U
Acetone		9 J	11	11	10 U	10 U
Carbon Disulfide		5 U	6 U	5 U	5 U	5 U
1,1-Dichloroethene		5 U	96 %	99 %	5 U	88 %
1,1-Dichloroethane		5 U	6 U	5 U	5 U	5 U
Trans-1,2-dichloroethene		5 U	6 U	5 U	5 U	5 U
Cis-1,2-dichloroethene		5 U	6 U	5 U	5 U	5 U
1,2-Dichloroethene (total)		5 U	6 U	5 U	5 U	5 U
Chloroform		5 U	6 U	5 U	5 U	5 U
1,2-Dichloroethane		5 U	6 U	5 U	5 U	5 U
2-Butanone		10 U	11 U	10 U	10 U	10 U
1,1,1-Trichloroethane		5 U	6 U	5 U	5 U	5 U
Carbon Tetrachloride		5 U	6 U	5 U	5 U	5 U
Bromodichloromethane		5 U	6 U	5 U	5 U	5 U
1,2-Dichloropropane		5 U	6 U	5 U	5 U	5 U
cis-1,3-Dichloropropene		5 U	6 U	5 U	5 U	5 U
Trichloroethene		5 U	101 %	106 %	5 U	101 %
Dibromochloromethane		5 U	6 U	5 U	5 U	5 U
1,1,2-Trichloroethane		5 U	6 U	5 U	5 U	5 U
Benzene		5 U	111 %	119 %	5 U	114 %
Trans-1,3-Dichloropropene		5 U	6 U	5 U	5 U	5 U
Bromoform		5 U	6 U	5 U	5 U	5 U
4-Methyl-2-pentanone		10 U	11 U	10 U	10 U	10 U
2-Hexanone		10 U	11 U	10 U	10 U	10 U
Tetrachloroethene		5 U	6 U	5 U	5 U	5 U

*= Outside of EPA CLP QC limits.

0000007

0000011

7/10/04

RFW Batch Number: 0404L223 Client: TNUHANFORD F03-018 H2556 Work Order: 11343606001 Page: 1b

Cust ID:	B17N52	B17N52	B17N52	VBLKED	VBLKED BS
RFW#:	001	001 MS	001 MSD	04LVG096-MB1	04LVG096-MB1
1,1,2,2-Tetrachloroethane	5 U	6 U	5 U	5 U	5 U
Toluene	5 U	109 %	116 %	5 U	110 %
Chlorobenzene	5 U	103 %	110 %	5 U	106 %
Ethylbenzene	5 U	6 U	5 U	5 U	5 U
Styrene	5 U	6 U	5 U	5 U	5 U
Xylene (total)	5 U	6 U	5 U	5 U	5 U
Acetonitrile	10 U	11 U	10 U	10 U	10 U
N-Butanol	76 J	100 J	100 J	250 U	250 U
N-butylbenzene	5 U	6 U	5 U	5 U	5 U
Hexane	2 J	2 J	2 J	5 U	5 U

*= Outside of EPA CLP QC limits.

000008

000012

7/10/05

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

LIONVILLE LABORATORY INC.

Client: TNU-HANFORD F03-018
LVL #: 0404L223
SDG/SAF # H2556/F03-018

W.O. #: 11343-606-001-9999-00
Date Received: 04-02-2004

GC/MS VOLATILE

One (1) soil sample was collected on 03-23-2004.

The sample and its associated QC samples were analyzed according to criteria set forth in Lionville Laboratory SOPs based on SW 846 Method 8260B for client specified volatile target compounds on 04-05-2004.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

1. All results presented in this report are derived from a sample that met LvLI's sample acceptance policy.

2. The sample was analyzed within required holding time.

3. A non-target compound was detected in the sample.

4. All surrogate recoveries were within EPA QC limits.

5. All matrix spike recoveries were within EPA QC limits.

6. All blank spike recoveries were within EPA QC limits.

7. Internal standard area and retention time criteria were met.

8. "I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."

J. Michael Taylor
President
Lionville Laboratory Incorporated

05-12-04
Date

som\group\data\voa\tnu-hanford\0404-223.doc

208 Welsh Pool Road • Exton, PA 19341-1313 • (610) 280-3000 • Fax (610) 280-3041

FLUOR Hanford Inc.	CENTRAL PLATEAU CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F03-018-079	Page 1 of 1

Collector	Company Contact	Telephone No.	Project Coordinator	Price Code	Data Turnaround
Pope/Pfister/Hughes	Steve Trent	373-5869	TRENT, SJ	8N	45 Days

Project Designation	Sampling Location	SAF No.	Air Quality
216-Z-9 Trench Characterization Borehole - Soil	216-Z-9/C3426 - Interval 90'-92.5'	F03-018	☐

Ice Chest No.	Field Logbook No.	COA	Method of Shipment
	HNF-N-3361	119152ES10	Federal Express

Shipped To	Offsite Property No.	Bill of Lading/Air Bill No.
~~EBERLINE SERVICES (Formerly TMA)~~ MAB 3/29/04 RECRA	See RSR	See RSR

POSSIBLE SAMPLE HAZARDS/REMARKS

RADIOACTIVE TIE TO:) B17NN0

Special Handling and/or Storage

SAMPLERS: Fill VOA vials with Zero head space.

Preservation	Cool 4C	Cool 4C	Cool 4C	Cool 4C (~~None~~ MAB 3/30/04)	None	Cool 4C					
Type of Container	aGs*	aG	aG	aG	aG	aG					
No. of Container(s)	3	1	1	1	1	1					
Volume	40mL	60mL	120mL	120mL	60mL	60mL					
SAMPLE ANALYSIS	See item (1) in Special Instructions.	See item (2) in Special Instructions.	See item (3) in Special Instructions.	See item (4) in Special Instructions.	See item (5) in Special Instructions. (crossed out, MAB 3/30/04)	TOC - 415.1; TIC - 415.1M					

Sample No.	Matrix *	Sample Date	Sample Time										
B17N52	SOIL	03/23/04	0835	X	X	X	X		X				

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
T. Pope / [signature]	3/23/04 1230	Sample Fridge Trailer	3/23/04 1230
Sample Fridge Trailer	4/1/04 0745	Greg Thomas / [signature]	4/1/04 0745
Greg Thomas / [signature]	4/1/04 0745	FED EX	
Fed Ex	4-2-04 10945	[signature]	4-2-04 10945

SPECIAL INSTRUCTIONS

(1) VOA - 8260A (TCL); VOA - 8260A (Add-On) {1-Butanol, Acetonitrile, cis-1,2-Dichloroethylene, Hexane, n-Butylbenzene, trans-1,2-Dichloroethylene}
(2) Semi-VOA - 8270A (TCL); Semi-VOA – 8270A (Add-On) {1,2,4-Trimethylbenzene, Cyclohexanone, Tributyl phosphate}; TPH-Diesel Range - WTPH-D {Total petroleum hydrocarbons - diesel range, Total petroleum hydrocarbons - kerosene range}
(3) ICP Metals - 6010A (TAL); ICP Metals - 6010A (Add-on) {Arsenic, Beryllium, Bismuth, Lead, Lithium, Phosphorus, Selenium, Strontium}; Mercury - 7471 - (CV)
(4) IC Anions - 300.0 {Chloride, Fluoride, Nitrate, Nitrite, Phosphate, Sulfate}; Ammonia - 350.3; Total Cyanide - 9010; pH (Soil) - 9045; NO2/NO3 - 353.2; Soil Cation Exchange Capacity - 9080; Sulfides - 9030; Chromium Hex - 7196; Oil & Grease - 413.1
(5) Gross Alpha; Gross Beta; Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}; Gamma Spec - Add-on {Antimony-125, Cesium-134}; Americium-241; Isotopic Plutonium; Isotopic Uranium; Total Uranium

Matrix *
S=Soil
SE=Sediment
SO=Solid
SL=Sludge
W=Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

A-6003-618(03/03)

0000015

Appendix 5

Data Validation Supporting Documentation

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: 216-Z-9			DATA PACKAGE: H2556		
VALIDATOR: LLI		LAB: LLI		DATE:	
			SDG: H2556		
ANALYSES PERFORMED					
SW-846 8260		SW-846 8260 (TCLP)	SW-846 8270		SW-846 8270 (TCLP)
SAMPLES/MATRIX					
B17N52					
					Soil

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? ..... Yes (No) N/A

Comments: _____

2. INSTRUMENT TUNING AND CALIBRATION (Levels D and E)

GC/MS tuning/performance check acceptable? ..... Yes No (N/A)

Initial calibrations acceptable? ..... Yes No (N/A)

Continuing calibrations acceptable? ..... Yes No (N/A)

Standards traceable? ..... Yes No (N/A)

Standards expired? ..... Yes No (N/A)

Calculation check acceptable? ..... Yes No (N/A)

Comments: _____

GC/MS ORGANIC DATA VALIDATION CHECKLIST

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E) ..... Yes No (N/A)
Calibration blank results acceptable? (Levels D, E) ..... Yes No (N/A)
Laboratory blanks analyzed? ..... (Yes) No N/A
Laboratory blank results acceptable? ..... (Yes) No N/A
Field/trip blanks analyzed? (Levels C, D, E) ..... Yes (No) N/A
Field/trip blank results acceptable? (Levels C, D, E) ..... Yes No (N/A)
Transcription/calculation errors? (Levels D, E) ..... Yes No (N/A)
Comments: no FB

4. ACCURACY (Levels C, D, and E)

Surrogates/system monitoring compounds analyzed? ..... (Yes) No N/A
Surrogate/system monitoring compound recoveries acceptable? ..... (Yes) No N/A
Surrogates traceable? (Levels D, E) ..... Yes No (N/A)
Surrogates expired? (Levels D, E) ..... Yes No (N/A)
MS/MSD samples analyzed? ..... (Yes) No N/A
MS/MSD results acceptable? ..... (Yes) No N/A
MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No (N/A)
MS/MSD standards? (Levels D, E) ..... Yes No (N/A)
LCS/BSS samples analyzed? ..... (Yes) No N/A
LCS/BSS results acceptable? ..... (Yes) No N/A
Standards traceable? (Levels D, E) ..... Yes No (N/A)
Standards expired? (Levels D, E) ..... Yes No (N/A)
Transcription/calculation errors? (Levels D, E) ..... Yes No (N/A)
Performance audit sample(s) analyzed? ..... Yes (No) N/A
Performance audit sample results acceptable? ..... Yes No (N/A)
Comments: NO PAS

GC/MS ORGANIC DATA VALIDATION CHECKLIST

5. PRECISION (Levels C, D, and E)

MS/MSD samples analyzed? ..... (Yes) No N/A
MS/MSD RPD values acceptable? ..... (Yes) No N/A
MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No (N/A)
MS/MSD standards expired? (Levels D, E) ..... Yes No (N/A)
Field duplicate RPD values acceptable? ..... Yes No (N/A)
Field split RPD values acceptable? ..... Yes No (N/A)
Transcription/calculation errors? (Levels D, E) ..... Yes No (N/A)
Comments: _____

6. SYSTEM PERFORMANCE (Levels D and E)

Internal standards analyzed? ..... Yes No (N/A)
Iinternal standard areas acceptable? ..... Yes No N/A
Internal standard retention times acceptable? ..... Yes No N/A
Standards traceable? ..... Yes No N/A
Standards expired? ..... Yes No N/A
Transcription/calculation errors? ..... Yes No N/A
Comments: _____

7. HOLDING TIMES (all levels)

Samples properly preserved? ..... (Yes) No N/A
Sample holding times acceptable? ..... (Yes) No N/A
Comments: _____

GC/MS ORGANIC DATA VALIDATION CHECKLIST

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E) ..... Yes No N/A
Compound quantitation acceptable? (Levels D, E) ..... Yes No N/A
Results reported for all requested analyses? ..... Yes No N/A
Results supported in the raw data? (Levels D, E) ..... Yes No N/A
Samples properly prepared? (Levels D, E) ..... Yes No N/A
Laboratory properly identified and coded all TIC? (Levels D, E) ..... Yes No N/A
Detection limits meet RDL? ..... Yes No N/A
Transcription/calculation errors? (Levels D, E) ..... Yes No N/A
Comments:_____

9. SAMPLE CLEANUP (Levels D and E)

GPC cleanup performed? ..... Yes No N/A
GPC check performed? ..... Yes No N/A
GPC check recoveries acceptable? ..... Yes No N/A
GPC calibration performed? ..... Yes No N/A
GPC calibration check performed? ..... Yes No N/A
GPC calibration check retention times acceptable? ..... Yes No N/A
Check/calibration materials traceable? ..... Yes No N/A
Check/calibration materials Expired? ..... Yes No N/A
Analytical batch QC given similar cleanup? ..... Yes No N/A
Transcription/Calculation Errors? ..... Yes No N/A
Comments:_____